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REVISED

INTERIM RESPONSE ACTIVITY WORK PLAN
TANDEM MILL POND (GAOI-2)
DSC, LTD.
GIBRALTAR, MICHIGAN

PREPARED

BY

ENVIRONMENTAL STRATEGIES CORPORATION

AUGUST 7, 2001

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CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Dennis Zurakowski
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Date: 8/10/01

1.0 Introduction

On December 17, 1999 DSC Ltd. (DSC) and the Michigan Department of Environmental Quality (MDEQ) agreed to a Comprehensive Corrective Action and Remedial Consent Order (Consent Order). The Consent Order sets forth DSC's environmental response activities under RCRA and Parts 111 and 201 of the Michigan Natural Resources and Environmental Protection Act (NREPA), at the DSC Trenton and Gibraltar facilities. The objective of the consent order is to develop and implement a comprehensive risk-based remedial program for the Gibraltar and Trenton facilities. The Consent Order prioritizes action at the waste management units (WMUs) and areas of interest (AOI) at the Gibraltar and Trenton facilities. The Tandem Mill Pond (TMP) at the Gibraltar facility (GAOI-2) is an earthen wastewater treatment impoundment formerly used to separate oil from cooling water. The TMP has the highest priority of the WMUs and AOI identified at the Trenton or Gibraltar facilities.

DSC submitted a revised Interim Response Activity Work Plan (Work Plan) for the TMP on May 23, 2000. On June 13, 2000, the MDEQ conditionally approved the TMP Work Plan. During the execution of the Work Plan, DSC has encountered conditions in the TMP that require revising the interim response activity. The amount of clay soil being removed from the base of the TMP has been greater than expected. This has led to a higher proportion of low permeability clay in the material to be treated. It will not be feasible to introduce sufficient air into the aerated piles to achieve the desired level of treatment. The alternate methods will be more effective at dealing with conditions encountered in the TMP, while still achieving the goals of the Interim Response Activity. DSC is submitting this revised Interim Response Activity Work Plan for MDEQ review and approval in accordance with Section 8.7 of the consent order.

1.1 Description of Gibraltar Facility and TMP

The Gibraltar facility (Figure 1) was constructed in the early 1950s and expanded periodically until the early 1970s. The 150-acre Gibraltar facility encompasses the mill building, the wastewater treatment ponds, 2 fill areas, and a former landfill (Figure 2). Historically, the steel finishing operations in the Gibraltar facility have included annealing, pickling, and cold rolling and associated storage and shipping operations. DSC Ltd. acquired the former McLouth Steel Products Company's Gibraltar Plant in August 1996. McLouth production activities at the

Gibraltar facility terminated in August 1996. DSC Ltd. personnel have been present at the facility performing maintenance and environmental cleanup tasks since taking possession of the property in August 1996. The facility remained idle as DSC developed business opportunities to support a restart of plant operations. DSC resumed limited operations at the Gibraltar facility in June 2001. The future land use of the property will remain industrial.

The Gibraltar facility is bounded on the east by River Road, on the north by an adjacent property, and on the west by two rail lines and, for a short distance, the Frank and Poet Drain. A rail spur forms the southern boundary and part of the eastern boundary of the property. The cold mill building is located on the northern half of the site. The southern portion is occupied by the ponds of the facility's permitted wastewater treatment system, including the TMP. A closed landfill (Landfill Area 1B) is located in the southwest corner of the property, west of the TMP. The Gibraltar facility is topographically flat, except for Landfill Area 1B.

The TMP is a 6 acre earthen surface impoundment constructed for oil separation at the time the Gibraltar Plant was constructed. The TMP received cooling water from the rolling mill and other process waters from the cold mill and ancillary production operations (Figure 3). Process and cooling water contained lubricating, hydraulic, rolling, and slushing oils. The oils included both petroleum and animal derived materials. McLouth acidified the water in the TMP to crack emulsified oil and promote oil separation from cooling water. Spent sulfuric acid contained in the Acid Dosing Pond (ADP) was used in the TMP. Separated oil was periodically removed and disposed off-site. Effluent from the TMP was pumped to a caustic addition station and then to other wastewater retention basins for further treatment prior to discharge (Figure 3).

1.2 Regulatory Background

The Gibraltar facility has not been the site of a hazardous waste treatment, storage or disposal facility, and is not subject to RCRA corrective action requirements. The activities at the Gibraltar facility are subject to NREPA Part 201 and the terms of the Consent Order. The Consent Order prioritizes assessment and response activities according to potential environmental impact. The TMP was assigned the highest rating in the priority schedule. Part 201 includes soil and groundwater cleanup criteria that are based on the land use of the subject property. The Gibraltar facility is zoned for industrial use, and DSC intends to continue

operating an industrial facility on the site. Therefore industrial cleanup criteria are appropriate for use at the facility.

DSC currently holds NPDES permit # MI0004227 for the wastewater treatment system at the facility. The TMP was formerly a component of the NPDES permitted treatment system. DSC has installed a pretreatment system to treat leachate from Landfill Areas 1A and 1B before the leachate is discharged to the wastewater treatment ponds. DSC has also installed a wastewater pretreatment system for oil and grease removal that discharges to the city of Gibraltar sanitary sewer system.

EPA Administrative Order No. R7003-5-99-003 (Appendix A) was issued to DSC in June 1999. The Order required that DSC take immediate measures to "stop the exposure of migratory birds to solid wastes at the Tandem Mill Pond" and to propose measures necessary to protect wildlife or wildlife habitat from any harmful effects of solid waste at the TMP. DSC prepared a Continuing Emergency Measures (CEM) Work Plan (ESC, 1999) to prevent any migratory birds from being exposed to oil present on and around the TMP, thereby preventing any harmful acute, subacute, or chronic effects. DSC continues to remove oil that rises to the surface of the TMP, cover oil present in the soil around the TMP, and deter wildlife from using the TMP. The CEM Work Plan was approved by US EPA on November 24, 1999. DSC will continue to implement measures described in the CEM Work Plan until the TMP has been drained and any oil present on and around the TMP has been covered as part of the corrective measure.

2.0 Description of Unit

The TMP is a 6-acre earthen surface impoundment excavated approximately ten feet into the native clay that underlies the site. The TMP was constructed at the time the Gibraltar Plant was initially built. The TMP historically received cooling water from the rolling mill and other process waters from the cold mill and ancillary production operations (Figure 3). The TMP was used to separate oil from the cooling and process waters by gravity separation. Lubricating and hydraulic oils from rolled steel and production equipment and cooling water flowed to the building sumps. The cooling and process waters were discharged to the TMP either directly (from the south anneal basement and the slitter basement) or indirectly via a collection sump (Tandem Mill Sump). The process oils that entered the TMP typically were composed of lubricating, hydraulic, rolling, and slushing oils. They included both petroleum and animal derived materials.

McLouth acidified the water in the TMP to separate oil from the water and to break any emulsions. Acid was added from the Acid Dosing Pond (ADP). The water in the TMP currently has a pH of approximately 3. The pH of the soil and sediment at the base of the TMP is not known, but is expected to be relatively low. A belt skimmer was installed in the northeast corner of the TMP to periodically remove separated oil by skimming, and the oil was then disposed off-site. Effluent from the TMP was pumped to a caustic addition station and then to other wastewater retention basins for further treatment prior to discharge through Outfall No. 01B into the Frank and Poet Drain (Figure 3). Since McLouth terminated operations, the amount of water pumped to the TMP from basement sumps typically has ranged from approximately 500 to 2,000 gallons per day (gpd) depending on the amount of precipitation. DSC terminated automatic discharges of basement sump water to the TMP in August 1999. Liquids in the sumps are now pumped into a vacuum truck, which discharges material into an oil/water separator tank at the TMP. Separated water is drained into the TMP, while oil is recovered from the tanks for disposal.

Landfill leachate formerly entered the TMP, but the leachate flow has been re-routed. Two non-hazardous industrial waste landfills located south (Landfill Area 1A) and west (Landfill Area 1B) of the TMP discharge leachate to a pH adjustment station next to Basin No 1. Each landfill has a leachate collection system that drains to an underground pump station.

The Landfill Area 1A pump station formerly discharged leachate to the Acid Dosing Pond. Approximately 4,000 gpd to 7,000 gpd of leachate enter the treatment system, depending on recent precipitation levels. The leachate from Landfill Area 1A and leachate from Landfill Area 1B have a pH of approximately 11.

Non-aqueous materials in the TMP generally are present in two forms – free floating oil and rag. The free floating oil currently appears only as small areas of light oil sheen on the water surface. The oil sheens observed on the TMP are releases of oil and rag from within the TMP. The rag layer appears to be a semi-solid, congealed emulsion of animal oils and fats, sediment, and water. The rag material has a density that causes it to sink to the bottom of the TMP during colder months, when the water temperature is lower. It tends to rise to the surface during the warmer months. Oil has also accumulated in soils on the banks of the TMP.

DSC has implemented several projects to control the materials that were left in the TMP when McLouth terminated operations at the plant in August 1996. These activities are described in the CEM Work Plan and in monthly progress reports submitted to U.S. EPA. In 1997, an oil removal contractor removed approximately 300,000 gallons of floating oil and rag from the TMP using a combination of recovery booms to accumulate the rag layer for vacuum removal. In 1998, an oil removal contractor reconfigured the oil containment boom on the TMP to better contain and minimize the area of floating oil. Approximately 57,500 gallons of oil and rag were removed from the TMP and disposed offsite in May 1999. By June 1999, all floating oil and rag had been removed from the TMP. DSC implemented a continuing recoverable oil management program to recover oil sheen that periodically appeared on the surface of the TMP. Approximately 4,800 gallons of oil, rag and water were removed from the TMP and disposed of off-site in June 1999.

As part of the oil management program, DSC repositioned the pump intake and level control sensors in the Tandem Mill Sump. The Tandem Mill sump now operates as an oil/water separator and stops the discharge of oil from the sump to the TMP. On July 6, oil was detected in the Tandem Mill Sump. The source of the oil was determined to be an accidental release that occurred during equipment maintenance. This volume of oil exceeded the separation capacity of the modified sump, and some of the oil was pumped to the TMP. Approximately 3,100 gallons of oil was removed from the TMP by vacuum skimming and transported off-site for reclamation. Following this release, DSC eliminated all direct discharges from basement sumps.

The discharge pipe from the Tandem Mill Sump was disconnected from the sump pumps, and the pumps were connected to a hose to allow DSC to directly load tanker trucks. The discharge pipe was capped. DSC also disconnected the power supply to the pumps in the South Anneal and Slitter basements. The power disconnects for these pumps have been locked out and tagged.

DSC currently pumps all liquids from the sumps into a tanker truck, and physically transports the water to an oil-water separator tank located next to the TMP. All water is treated in the separator prior to being discharged to the TMP. A contractor periodically removes the oil in the separator for off-site disposal.

In August 1999, DSC retained Animal Services of Michigan LLC (ASM) to implement wildlife deterrent measures and to provide wildlife rehabilitation if necessary. The measures implemented to date by DSC include:

- installing a chain link fence around the pond
- removing vegetation within the fence line
- installing wildlife netting over potential oil accumulation areas
- installing and operating two propane cannons
- installing and operating an ultrasonic bird repellent
- covering oily soils around the perimeter of the TMP with peat sorb and filter fabric
- installing mylar streamers across sections of the pond surface to deter waterfowl
- regular patrols by DSC personnel with pyrotechnic devices

The wildlife deterrent measures are described in detail in the CEM Work Plan.

DSC submitted a draft Work Plan on March 31, 2000, received MDEQ comments, and submitted a revised Work Plan on May 23, 2000. The Work Plan was conditionally approved by MDEQ on July 13, 2000. DSC began to implement the IRA in 2000. Due to heavy rainfall and equipment malfunctions, the TMP could not be completely dewatered before the end of the year. Winter prevented any additional activity in 2000.

In spring 2001, DSC continued dewatering of the TMP and gradually exposed the sediment on the western side of the pond. DSC began consolidating sediment in this area of the pond in accordance with the approved Work Plan. Due to the conditions in the base of the TMP, the Contractor was not able to remove just 6 to 12 inches of sediment and clay from the base as planned. Instead, up to 4 feet of soil was removed to ensure that impacted sediment and soil was

not mixed with underlying clean soil. This will increase the amount of soil removed by a factor of 3 to 4, making the proposed aerated piles less permeable and making it infeasible to introduce sufficient air into the piles. Soil removal has been stopped, pending MDEQ approval of a revised approach to the TMP response activity.

2.1 Environmental Setting

The stratigraphy at the Gibraltar facility generally consists of fill overlying lacustrine clay, which in turn overlies limestone bedrock. The underlying clay layer varies in thickness from 18 feet to 35 feet at boring locations across the site. The surface fill varies in thickness from 5 feet to 15 feet across the entire site and from 8 to 12 feet around the TMP. The thickest areas of fill were south of the TMP and north of the mill building. A fence diagram for the facility is shown in Figure 4.

Several monitoring wells and soil borings have been installed around the perimeter of the TMP. Boring logs for these points are included in Appendix B. The logs indicate that the TMP was excavated through the surficial fill into the underlying clay layer. The lacustrine clay layer extended to a depth of at least 39 feet below grade at the three bedrock monitoring wells installed adjacent to the TMP (MW-3, MW-4 and MW-7). The maximum depth of the TMP is 13 feet below grade, and therefore there is more than 20 feet of lacustrine clay between the base of the TMP and the underlying bedrock aquifer.

Water at the site is found in two distinct layers. A thin layer of perched water has been observed above the clay layer in some areas, including south of the TMP (GMW4). The thickness of the saturated zone at GMW4 has been approximately 10 feet on the two occasions when water elevations have been measured. Water in the TMP is connected with this shallow perched zone and may be the primary source of water in the perched zone. The shallow monitoring well GMW4 was set in the perched saturation because of the potential relationship with the ponds. Wet fill soil was observed at the fill/clay interface south (borings for GMW5 and GMW6) and west (boring for GMW7) of the TMP. However, no monitoring wells were set at these locations because the observations suggested there would be insufficient groundwater yield for sampling. During the one sampling event conducted at the site to date, a sample was collected from GMW-4.

The direction of flow in the perched zone has not been determined, as GMW4 is the only monitoring point. The perched water may flow to the TMP, the Detroit River or to the Frank and Poet Drain. The Frank and Poet Drain is 1,300 feet southwest of the TMP at its closest point. The Detroit River is approximately 3,000 feet east of the TMP. The impact of draining the TMP on the perched water will be determined during the corrective measure.

Groundwater was observed at the clay/bedrock interface at all locations drilled on the site. Twelve monitoring wells were screened at this interface. Groundwater elevations in the bedrock monitoring wells were higher than the clay/bedrock interface. This indicates that groundwater within the bedrock is confined by the overlying clay layer. Groundwater elevations recorded in the bedrock aquifer in August 1997 are shown in Figure 5. Elevations recorded in January 2000 are shown in Figure 6. The potentiometric surface is relatively flat in the area of the TMP. A groundwater mound was present around MW7 in August 1997, but was not present in January 2000. The groundwater high may be due to the presence of Landfill Area 1B, and may be a temporary or seasonal condition.

Based on the difference in the potentiometric surface in the perched zone and the bedrock aquifer, there is a potential for a vertical gradient towards the bedrock aquifer. However, based on the presence of more than 25 feet of clay, communication between the two zones is not expected.

2.2 Prior Investigations of the TMP

An assessment of the TMP was performed in December 1997 to support evaluation of possible closure options (Appendix C). The depth of water in the TMP ranged from 6.5 to 13 feet, with deeper areas on the east. The oily rag material was the only material present on the bottom of the TMP. The presence of the rag on the bottom of the pond was consistent with increased density resulting from lower air and water temperatures in December. The bottom of the pond was composed of dense clay, and no sludge or sediment was observed on the bottom of the pond. The combination of process water with low solids content, the low pH in the pond, and the types of oil used in the rolling operations prevented the deposition of oily sludges on the pond bottom.

TMP CONTENTS

In 1997, two composite samples of the submerged rag were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), PCBs, and metals. One composite sample of the sediment and clay at the base of the TMP was collected in April 2001, and analyzed for SVOCs. Phenol and 2,4-dimethylphenol were detected in all three samples, and several PAHs were detected in the sediment sample (Table 1). The concentrations of phenol and 2,4-dimethylphenol in the April 2001 sediment sample were lower than in the 1997 rag samples. Fluoranthene, fluorene, naphthalene, and phenanthrene were detected at concentrations greater than generic Part 201 GSI criteria. The detection limits for the SVOC analysis were lower than for the previous analysis. The phenanthrene concentration in the soil sample was also greater than Part 201 volatilization to ambient air criteria. PCBs and VOCs were not detected in the rag samples. All target metals except mercury, selenium, and silver were measured in the rag at concentrations greater than 1 mg/kg.

The rag samples contained concentrations of oil and grease as high as 75 percent. The samples were analyzed by Method 413.1, Total Fats, Oil and Grease (FOG), which detects vegetable and animal based oils and fats. Method 413.1 is a gravimetric method, and therefore is less specific than infrared spectrophotometric methods. The samples were not analyzed for petroleum hydrocarbons (i.e. Method 418.1), and therefore it is not known whether the FOG detected was exclusively composed of animal and vegetable based FOG. The detection limits for PAH analysis (100 mg/kg) in the rag samples were relatively high, which may be why PAHs were detected in the sediment sample but not in the rag samples.

The two composite samples of the rag from the TMP were composited into a single sample, and tested using the toxicity characteristic leaching procedure (TCLP). The TCLP leachate contained low concentrations of metals (Table 2). The composite sample did not exhibit the characteristics of hazardous waste. The concentrations of barium, copper, and zinc in the leachate were greater than the Part 201 default GSI criteria for industrial land use.

SOILS

No samples have been collected of the soils around the edges of the TMP.

GROUNDWATER

Duplicate samples collected from GMW4 in the shallow saturation at the fill/clay interface contained copper and 2,4-dimethylphenol at concentrations above Part 201 GSI criteria

(Table 2). Ammonia was detected at 32 and 35 mg/l in samples from GMW4. For reference, ammonia was not detected in samples collected from the bedrock wells. No other analytes were detected at elevated concentrations in the water samples from GMW4.

Groundwater samples were also collected from bedrock monitoring wells during the initial site assessment. No metals were detected in the samples from the bedrock well samples at concentrations above the MDEQ default drinking water criteria or GSI criteria. Phenol and 2,4-dimethylphenol were detected in groundwater samples from one bedrock well, GMW7. The concentration of 2,4-dimethylphenol detected in the sample from GMW7 exceeded the Part 201 GSI criteria. Laboratory analytical reports for groundwater samples collected in the vicinity of the TMP are included in Appendix C.

Leachate from Landfill Area 1A is a potential source of the phenols detected in GMW-7. Potential migration pathways from the landfill to the bedrock aquifer are vertical migration through the thick clay layer at the site, or, more likely, migration via a conduit such as a well casing. The bedrock monitoring wells installed at the site were not double cased, which could provide a temporary migration pathway. The phenolic compounds in GMW7 may be due to the well casing serving as a temporary conduit between the perched zone and the bedrock aquifer. This could have resulted in the detection of low concentrations of phenolic compounds in GMW-7. The concentrations would be expected to decline over time, as there would be no continuing source of phenols to GMW-7 once the well annular space was sealed. GMW-7 has not been sampled since the initial installation, and therefore changes are not known at this time. Phenolic compounds were not detected in any of the bedrock wells downgradient of GMW-7. This indicates that the thick confining layer of clay under the pond has prevented releases from the ponds (or the landfill) to the bedrock aquifer.

2.3 IRA Summary

The TMP response activity will remove petroleum-impacted soils around the edges of the TMP and combine it with sediments from the bottom of the TMP. The combined material will be mixed with fly ash to stabilize the material and to increase its compressive strength. The stabilized material will then be placed in a sediment cell in the southeast portion of the TMP. A cover will be constructed over the stabilized material to prevent direct human contact and limit infiltration.

Clean fill material will be placed in the rest of the TMP cavity and graded to drain stormwater runoff away from the cell. A deed restriction will be placed on the stabilized fill material, and groundwater monitoring will continue for 3 years. Bedrock ?

Specific steps in the interim response activity for the TMP include:

- Cap or remove all pipes discharging to and from the TMP, including the Landfill 1B leachate collection system and ADP overflow pipe.
- Remove and treat surface water in the TMP and discharge to the NPDES treatment system.
- Consolidate contaminated sediments and potentially impacted soils around the TMP perimeter within the sediment cell.
- Mix the consolidated soil and sediment with fly ash to improve material strength and reduce leachability of constituents.
- Grade and compact the treated soils within the sediment cell.
- Cover the sediment cell to prevent infiltration and exposure.
- Place a deed restriction on the sediment cell.
- Place clean fill in the TMP cavity and regrade to promote surface runoff.
- Conduct an investigation of groundwater in the perched zone and the bedrock aquifer.
- Maintain the area and monitor groundwater.

These actions are described more fully in Section 4.

2.4 Continuing Emergency Measures

The oil management program and wildlife deterrent measures described in the CEM Work Plan will continue until the start of corrective measures in the base of the TMP (i.e., soil consolidation). At that time, all standing water will have been removed from the TMP, and oil contaminated sediment and soil will be consolidated into a treatment pile and covered. There will be no potential wildlife exposure to contaminated sediment after that time, and therefore the emergency measures will be discontinued. The chain link fence and propane cannons will be left in place while DSC drains the TMP, and will be removed at the beginning of activities in the base of the TMP.

Areas of rag and oily sediment on the banks and the bottom of the TMP will become exposed as the water level in the TMP is lowered. DSC has amended the original CEM Work Plan to address potential wildlife exposure to oily soil and sediment exposed during draining of the pond. The primary measure will be cover areas of oily soil or sediment exposed by draining the TMP with a flexible latex membrane. A polymer latex mixture will be sprayed onto the sediments using a surfactant solution as a dispersant. As the air bubbles in the foam collapse, the latex coagulates to form a continuous flexible membrane that adheres to horizontal and sloping surfaces, including irregular surfaces such as the bottom of the TMP. The latex and surfactant solutions are biodegradable and are not expected to affect the treatment of soil and sediment from the TMP. Additional measures, which are described in detail in Appendix D, will include the following steps:

- Delay TMP dewatering until the end of the spring migration season (after June 1).
- Increase the dewatering flow rate (subject to meeting NPDES permit requirements).
- Instruct all contractor and subcontractor personnel working on the IRA in the goals and procedures of the CEM Work Plan.
- Install bird netting over oily sediments or soil that pose a hazard to wildlife and cannot be covered by the spray applied membrane.
- Excavate, consolidate and cover oily sediments or soil.

3.0 Risk Evaluation

3.1 Conceptual Site Model

This Conceptual Site Model (CSM) was developed to assess the nature and extent of constituents identified at the site and the potential routes of exposure for human and ecological receptors. The CSM is based on submerged oily rag, sediment and groundwater data collected at the Gibraltar facility (Tables 1 and 2). The CSM is intended to serve as the technical basis for evaluating the corrective measures at the site. The expectations for the TMP are to consolidate and cover impacted sediment and soil and to partly fill in the TMP cavity, as noted in Section 2.3. All of the data used for developing this CSM were assumed to be usable with respect to representativeness and quality.

3.1.1 Constituents of Interest

Analytical results from prior sampling at the Gibraltar facility were reviewed and compared to screening criteria to focus the conceptual model on the constituents of interest in various media on-site. Screening criteria were selected from the Part 201 generic criteria tables. The MDEQ has established the Part 201 generic screening criteria for soil and groundwater based on a variety of potential receptors and pathways. The applicable potential receptors and exposure pathways were evaluated for the TMP site. Sediments were evaluated using the soil screening levels. Based on this evaluation, constituents of interest (COIs) were identified in soil and groundwater. There are no data for the surface soils surrounding the TMP.

The following COIs were detected in the sediments and groundwater at levels greater than Part 201 screening criteria:

- sediment and submerged rag – 2,4-dimethylphenol, phenol, fluoranthene, fluorene, naphthalene, phenanthrene, arsenic, barium, copper, lead, and zinc
- groundwater – 2,4-dimethylphenol, phenol, barium, and copper

Each of the constituents listed exceeded the generic Part 201 groundwater to surface water interface (GSI) or GSI protection criteria. The concentration of phenanthrene in the sediment sample was also greater than the volatilization to ambient air criteria. Cadmium, magnesium, manganese and nickel were also selected as COIs based on their common presence at steel mill facilities. The COIs for the TMP are listed in Table 3.

Additional SVOCs may be present in soil and sediment in the TMP. Soil samples collected from the TMP will be analyzed by Method 8270, and all results will be reported. If any semi-volatile compound is detected in soil or groundwater samples at concentrations greater than its Part 201 criteria, that compound will be included as a COI for the TMP in the future.

3.1.2 Potential Receptors and Pathways of Exposure

A summary of the current potential receptors and pathways of exposure at the TMP is presented in Figure 7. The evaluation was based on the pathways identified in the Part 201 guidance and the following assumptions:

- Normal operation and maintenance activities can currently result in worker exposure to surface soils and pond water. There currently is a complete pathway for direct contact with on-site soil and pond water by on-site workers. Trespassing is minimal due to the chain-link fence and locked gate at the facility, but still may occur.
- The corrective measure for the pond includes removal of the surface water, treatment and capping of surface soils and sediments, and backfilling with clean unclassified fill. This will remove the potential for worker contact with surface soils and pond water. Future expansion of the Gibraltar facility may occur in the pond area. Therefore, direct contact with surface and subsurface soil constituents may be possible for utility or construction workers in the future after the pond is closed. Workers may also be exposed by volatilization of organic compounds to the ambient air.
- The perched zone downgradient of the pond is not a potable water source. However, the perched water may ultimately discharge to the Frank and Poet Drain or the Detroit River. Therefore, groundwater discharge to surface water is a potential exposure pathway under current and future conditions.
- The bedrock aquifer is not a current potable water source. Based on the clay confining layer between the perched and bedrock groundwater, there is little potential for vertical migration to perched groundwater prior to its discharge to the Frank and Poet Drain or the Detroit River or the bedrock aquifer's use as a potable water source.

- Current ecological receptors may include terrestrial species that come in contact with surface soil constituents and aquatic species in the surface water and sediment of the pond and ultimately the Detroit River. Wildlife deterrent measures are employed to reduce the potential for wildlife exposure at the pond. Once the pond has been drained and backfilled, the future exposure to ecological receptors will be limited to exposure to buried treated soils and exposure to groundwater that discharges to the Frank and Poet Drain or Detroit River.

3.1.3 Closure Criteria

There will be some potential exposure pathways present for some receptors upon completion of the corrective measure. To protect human and ecological receptors, the Part 201 generic cleanup criteria will be applied to the corrective measure. Part 201 states that cleanup criteria other than the generic residential criteria may be used, provided that (1) the person proposing the plan documents that current zoning of the property is consistent with the cleanup criteria category (i.e. commercial or industrial), and (2) that current and reasonably foreseeable uses are consistent with current zoning. MDEQ Operational Memorandum #18 states that industrial land use may be defined as (1) the primary activity at the facility is and will continue to be industrial, or (2) the current zoning of the property is industrial. The Gibraltar facility meets these criteria. The facility is zoned for industrial uses. The proposed future activities at the facility, and in the area of the TMP are also industrial. Access to the facility is, and will continue to be, restricted by fences and security personnel. Therefore the use of the Part 201 industrial criteria is appropriate for the TMP. The Part 201 industrial groundwater and soil cleanup criteria are included in Appendix E.

3.1.3.1 Calculation of Groundwater Surface Water Interface Protection Criteria

Generic GSI protection criteria for soil were developed using the procedures outlined in Part 201. For cadmium, copper, lead, manganese, nickel, and zinc, the GSI value is site-specific and water quality dependent.

Final Chronic Values (FCVs) for the protection of aquatic life were calculated as provided in Footnote G to the Part 201 Generic Cleanup Criteria and Screening Levels tables. A hardness value of 100 mg/l of calcium carbonate was used in the calculations, based on data for the Detroit River. Hardness data for the Frank and Poet Drain is not available, but is not expected to be significantly different than the Detroit River. Each of the calculated FCVs was

less than the surface water human non-drinking water value (HNDV) provided in Footnote G. In cases where the calculated criterion was less than the analytical Target Detection Limit (TDL), the criterion was set equal to the TDL. The GSI criterion or FCV in some cases is not protective for surface water that is used as a drinking water source. Footnote X of the Part 201 tables states that for groundwater discharges to the Great Lakes and their connecting waters or discharges in close proximity to water supply intake(s) in inland waters, the generic GSI criterion for water is the Surface Water Drinking Water Value (SWDWV), or, for the criteria that are hardness dependent, the lesser of the SWDWV and the FCV. The Detroit River is a connecting water of the Great Lakes, and therefore Footnote X does apply. Arsenic and cadmium had SWDWV values less than the calculated FCVs, and the GSI values in Appendix E are equal to the SWDWV. The lowest of the applicable Part 201 water criteria were selected as the cleanup criteria for water.

The GSI soil value corresponding to the groundwater GSI value was calculated using the methods in the Part 201 Generic Soil/Water Partitioning Criteria: Technical Support Document. This calculation applies a Dilution Attenuation Factor of 16 to the GSI for water calculated using Footnotes G and X. Soil – water partition coefficients (K_d values) were obtained from the EPA Soil Screening Level (SSL) Guidance Attachment C Chemical Properties for SSL Development with the exception of lead. The SSL Guidance provides pH-based values estimated using the MINTEQ2 geochemical speciation model. For lead, the K_d value was obtained from "Review and Analysis of Parameters and Assessing Transport of Environmentally Released Radionuclides through Agriculture" (Base et al., Oak Ridge National Laboratory, 1984). A soil pH of 8.0 was used for the K_d values where applicable. The calculation spreadsheet is included in Appendix E.

The applicable Part 201 criterion with the lowest value was selected as the soil cleanup criteria. If the lowest Part 201 criterion was less than default background concentrations, then the background concentration was selected as the Part 201 criteria. In most cases, the limiting criterion is based on the GSI criteria. Application of this criteria is contingent on demonstrating that the constituent could be transported from the solid phase to groundwater and then to the Detroit River or other receiving water.

Site specific background concentrations have not been determined for soil or groundwater at the Trenton facility. During installation of groundwater monitoring wells (Section 5.0), samples of the clay layer will be collected and analyzed for the COIs in Table 3.

This information will be compiled for future use in estimating background concentrations of metals in the lacustrine clay at the site. It is not expected that site specific background concentrations will be determined during the TMP corrective measure.

4.0 Corrective Measure

This section describes the interim response activity that will be implemented at the TMP, including soil sampling activities. The proposed groundwater investigation is described in Section 5.0. Construction activities will be conducted in accordance with the specifications in Appendix F. The Contractor will be required to prepare a Health and Safety Plan for their personnel. The Health and Safety Plan will include the Gibraltar Facility HASP as a reference.

Prior to beginning the corrective measure, the oil/water separator currently discharging to the TMP will be reconfigured or replaced. DSC will continue to discharge landfill leachate to the TMP during the spring of 2000. Before dewatering the TMP, DSC will discontinue leachate discharges to the TMP. The Landfill Area 1B leachate collection system discharge pipe to the TMP will be capped, and the overflow pipe from the ADP to the TMP will be removed. If the permitting and installation of the revised leachate treatment system is complete, then the leachate discharges from Landfill Areas 1A and 1B will be piped to Water Retention Basin #1. If system installation is not complete, all leachate discharges will be temporarily directed to the ADP and then pumped to a tanker truck for off-site disposal.

4.1 Water Removal and Treatment

The water in the TMP will be pre-treated and discharged to Retention Basin #1. The existing NPDES permit authorizes DSC to discharge 750,000 gallons per day (gpd) of treated landfill leachate and storm water. The estimated total leachate flow is less than 10,000 gallons per day (gpd). The flow from the TMP will be the primary flow to the NPDES treatment system during dewatering. Subject to continued compliance with the facility's wastewater discharge permit, the maximum flow from the TMP during dewatering will be maintained at or below 300,000 gpd in order to increase the residence time in the retention basins. The volume of the four retention basins is approximately 5 million gallons, providing a minimum of 16 days retention of all water pumped from the TMP.

The estimated volume of water in the TMP in October 1999 was approximately 13 million gallons. At a pumping rate of 300,000 gpd, it will take more than 40 days to dewater the TMP, because DSC anticipates that perched groundwater will infiltrate into the TMP as the water level falls. DSC anticipates that the flow rate may be less than 300,000 gpd, due to

limitations of the pre-treatment unit and the potential for higher concentrations of oil and grease as the water level approaches the bottom of the TMP. From May 1 to September 30, the facility's wastewater discharge must meet an oxygen demand limit of 38.6 milligrams per liter (mg/l) and an ammonia limit of 5 mg/l. If the wastewater treatment system is not able to meet the discharge requirements at the 300,000 gpd flow rate, DSC will reduce the flow rate.

The water from the TMP will be treated by caustic addition prior to discharge to Retention Basin #1. The existing retention basins will provide additional treatment of the discharge. The goal of pre-treatment will be to reduce the oil and grease concentration to the NPDES permit limit of 10 mg/l. Portable tanks will be installed ahead of the caustic addition station to remove FOG and hydrocarbons by gravity separation. As the water level in the TMP drops and more soil and sediment is exposed, the oil & grease and/or petroleum hydrocarbons concentrations in the TMP discharge may increase. A coalescing filter will be used if necessary to achieve the oil & grease limits. The existing caustic addition unit may be used for pH adjustment. The discharge into Basin #1 will be monitored continuously for pH, daily for ammonia using field test kits, and weekly for FOG by Method 413.2 and TPH by Method 418.2. Ammonia concentrations in Basins #2, #3 and #4 will be measured every other day using field test kits. NPDES permit-required sampling will also continue to ensure that the facility's NPDES permit limits are not exceeded.

DSC may remove submerged rag material from the TMP during dewatering, in order to reduce loadings to the pretreatment system. Recovered rag material will be sent for off-site disposal.

Precast concrete and wooden sections are located between the eastern edge of the TMP and the adjacent rail spur, and define the eastern boundary of the TMP. The sections will be removed during the corrective measure and disposed of in accordance with state and federal regulations.

4.2 Sediment Cell Construction

After the TMP has been drained, soil and sediment will be consolidated in the southeast portion of the pond. The December 1997 sampling did not detect an accumulation of oily sediment or residue on the pond bottom. The native clay on the pond bottom is not expected to

have permitted significant vertical migration of water or compounds. DSC will remove up to 4 feet of clay soil from the base of the pond.

The soil consolidation will occur in two separate phases. When the western portion of the pond has been exposed by dewatering, a north-south berm will be constructed across the TMP in the approximate location shown in Figure 8. The sediment and rag material on the west side of this berm ('Area 1') will be excavated to a depth of at least 2 feet, and the excavated material placed on the west side of the berm. The underlying soil in Area 1 will then be sampled as described in Section 4.3.

The second phase of consolidation will occur after the TMP has been completely dewatered. DSC will construct a berm across the TMP as shown in Figure 8. The sediment and rag material on the north side of this berm ('Area 2') will be excavated to a depth of at least 2 feet, and the excavated material placed on the south side of the berm. The underlying soil in 'Area 2' will then be sampled as described in Section 4.3.

Six to 12 inches of soil will also be removed from the banks of the TMP and around the TMP perimeter. This material will be placed in the sediment cell with the soil from Area 1 and Area 2. Any soil with visible petroleum staining will also be removed and placed in the sediment cell. The limit of excavation will be one foot beyond any visibly stained soils. The excavated soil will also be screened using a photoionization detector (PID). If the PID detects the presence of volatile organic compounds (VOCs), then the extent of excavation will also be guided by the soil screening.

The soil beneath the rail spur on the eastern edge of the TMP will not be removed. Any petroleum-stained soil adjacent to the rail spur will be removed to a minimum depth of six inches and replaced with clean fill. The soil will be placed in the sediment cell.

The size of the sediment cell in Figure 8 is based on constructing a cell with a final elevation equal to the surrounding grade. The size of the sediment cell may be adjusted slightly, depending on the amount of material actually excavated. If more material is excavated from Areas 1 and 2, the sediment cell will be expanded slightly to the north to accommodate the extra material without raising the height of the cell. If less material is excavated, the boundary will be moved to the south.

4.2.1 Sediment and Soil Treatment

The consolidated sediment and soil will have a high moisture content and low compressive strength. Therefore the sediment and soil will be mixed with fly ash to improve the compressive strength of the material, and allow cover material to be placed on the sediment and soil. The stabilization will also decrease the leachability of metals in the consolidated material, reducing any potential groundwater quality impacts. The primary constituents of interest, phenols and PAHs, are not expected to be significantly affected by the stabilization.

A pilot test of fly ash stabilization is being conducted by August Mack Environmental of Livonia (Appendix F). Fly ash will be added at rates of 25 percent, 33 percent and 50 percent by weight, and the mix evaluated for percent moisture, volume increase and unconfined compressive strength (UCS). The objective of treatment will be to produce a material with a minimum UCS of 30 psi.

Fly ash will be mixed with the consolidated soil and sediment using standard construction equipment. Fly ash will be added as material is placed in the sediment cell, to ensure that fly ash is mixed with material at the base of the cell. All mixing is expected to take place within the sediment cell. Because the berms will be constructed around the edges of the sediment cell, stormwater runoff will not exit the treatment area.

Samples will be collected of the material in the sediment cell to document the constituents present and their concentrations. Six samples will be collected from the consolidated material before it has been mixed with fly ash. Six additional samples will be collected after the sediment has been mixed with fly ash. Samples will be collected using stainless steel sampling equipment in accordance with the QAPP, and analyzed for SVOCs, TPH, and metals as indicated in Table 7. If it is determined that total concentrations for a metal COI exceed the generic Part 201 GSI criteria, then the stabilized mixture will be tested for leachable metal concentrations. The post-treatment samples will also be extracted using the Synthetic Precipitation Leaching Procedure and the extract analyzed for metals.

4.2.2 Storm Water Management

During the course of the IRA, the TMP will remain an open cavity. Potentially contaminated material on the bottom of the TMP will be removed in stages. For those areas where confirmation sampling has verified that cleanup criteria have been met, rainfall into the TMP will not come into contact with constituents at concentrations of concern. Runoff from

these areas will be allowed to drain from the TMP to the stormwater drainage area west of Retention Basin #3.

In the portions of the TMP that have not yet been excavated, collected stormwater precipitation will be pumped to Retention Basin #1.

4.2.3 Cover

After the sediment has been consolidated, mixed with fly ash, and sampled, a soil cover will be constructed over the treated sediment. The sediment will be covered with 12 inches of clean clay fill and 6 inches of topsoil. The clay will provide a barrier to infiltration of precipitation through the sediment. Clay material will be placed in 6-inch lifts and compacted to 90 percent of standard Proctor density. In areas that may be used for traffic or site operations, DSC may place 6 inches of unclassified fill and gravel in lieu of topsoil.

The TMP area outside the sediment cell will be regraded to promote surface runoff. Surface water runoff from Areas 1 and 2 will be directed to a surface water outlet in the northwest corner of the pond (Figure 11). Clean fill material will be placed as necessary to achieve the proper contours. Clean fill will be placed to surrounding grade around the border of the TMP. Surface water runoff from the north and west sides of the sediment cell will also be directed to the outlet in the northwest corner of the pond. Surface water runoff from the south and east sides of the sediment cell will be directed to the southeast, and will enter the drainage swale between the TMP and Landfill Area #1A. The drainage along the base of the sediment cell will have a slope of not more than 3 percent to minimize surface erosion of the pile material. A 24-inch diameter pipe will be installed from the northwest corner of the TMP to the ditch west of Retention Basin #3. Rip-rap will be placed at the pipe inlet and outlet.

The final use of the area outside of the sediment cell is not known at this time. The regraded area will be seeded to reduce dust generation, except for any areas to be used for staging or storage, which would be covered with gravel. Seeding will be conducted in accordance with the specifications in Appendix H.

4.3 Verification Sampling

After visibly impacted soil has been removed from Areas 1 and 2 of the pond and consolidated into the sediment pile, soil verification samples will be collected to determine whether the material meets the site soil cleanup criteria. Areas 1 and 2 will be sampled

separately. Based on the MDEQ Guidance Document *Verification of Soil Remediation*, a grid system will be superimposed on each area before sampling begins. The grid spacing will be calculated from the actual dimension of the excavated area. The grid will be extended beyond the TMP perimeter to ensure that soils at the edge of the pond are represented.

Based on the size of Areas 1 and 2, the grid spacing would be approximately 30 feet (Figure 9). The guidance document suggests collecting samples from 12 locations or 25 percent of the points in a grid area. Using the 25 percent rule, 15 to 20 samples will be collected from each area, with the actual number collected depending on the final size of the areas.

Soil samples will be collected using a soil auger in accordance with the QAPP. The soil core will be split, with the 0 to 6 inch portion submitted for immediate analysis. The 6 to 12 inch portion of the core will be held by the laboratory pending analysis of the first sample.

Verification samples will be analyzed for SVOCs, and the metals listed in Table 3. Five samples will also be analyzed for PCBs to confirm that PCBs are not present. Analytical results from each area will be evaluated separately and will be compared to the soil cleanup criteria in Table 5. If the 95 percent confidence interval of the sample data (determined using Student's t-test) is less than the cleanup criteria, then the cleanup criteria will be met. If the sample data for any parameter is not normally distributed, then the data will be statistically transformed to a normal distribution using appropriate statistical techniques.

If the results from the initial samples from each area are not sufficient to establish the sample mean, confidence interval or the type of distribution, then additional verification samples will be collected and analyzed for SVOCs, FOG, and the metals listed in Table 3.

If any SVOCs not listed in Table 5 are detected in the verification samples, then the concentrations present will be compared to the compound's Part 201 criteria. If the compound's concentration in any single sample exceeds the compound's Part 201 criteria, then the statistical parameters for the compound (type of distribution, mean, standard deviation) will be calculated. If the 95 percent confidence interval of the sample data (determined using Student's t-test) is less than the cleanup criteria, then the cleanup criteria will be met.

If the 95 percent confidence interval of the sample data of any metal exceeds a soil cleanup criteria based on the GSI protection criteria (Table 5), then any individual sample that exceeds the soil criteria will be extracted using the SPLP method (Method 1312). The extracted fluid will be analyzed for the metal that exceeds the cleanup criteria. If the concentration of the

metal in the extract does not exceed the GSI water criteria in Table 4, then the cleanup criteria will be considered attained.

In addition, if the 95 percent confidence interval of the sample data of any parameter exceed the soil cleanup criteria then the 6 to 12 inch soil samples will be analyzed for that parameter. This data will be used to determine if sample concentrations decrease with depth.

4.4 Permits

It is not expected that the Interim Response Activity will require additional permits beyond those already held by DSC. Wastewater discharges are permitted under DSC's existing NPDES permit. Potential air discharges from the pond sediment are expected to be minimal, because volatile compounds are not present in the sediment.

The corrective measure will not involve building any permanent structures, and therefore no building licenses are expected to be necessary. Well abandonment, if any, will also be conducted in accordance with state requirements.

4.5 Deed Restriction

Soils placed within the sediment cell are expected to contain phenanthrene concentrations greater than volatilization to ambient air criteria. The area will be covered by a clay layer, which is expected to reduce potential volatilization of phenanthrene. Soils are also expected to contain several other constituents at concentrations greater than GSI protection criteria. The area of impacted soil shown in Figure 6 will be recorded on the deed for the site, and a deed restriction filed for the impacted area (Appendix G).

To prevent potential exposure to groundwater at the site, DSC will implement a deed restriction prohibiting the use of groundwater from the unconsolidated water-bearing zone. This will be done regardless of whether water samples collected from the unconsolidated zone at the site contain concentrations of several constituents that are greater than drinking water criteria. The deed restriction will apply to the upper zone at the entire Gibraltar facility. Draft language for the deed restriction/restrictive covenant is included in Appendix H. The restrictive covenant will be executed and recorded with the site deed.

5.0 Groundwater Investigation

During the response activity, groundwater elevations in all monitoring wells at the Gibraltar facility will be measured at least once every six months, and a potentiometric surface map will be created for the bedrock aquifer. The groundwater investigation will consist of two new wells in the perched zone, one new bedrock well, and two rounds of sampling seven existing monitoring wells and the three new monitoring wells.

After the TMP has been drained and the sediment consolidated into the static pile, the groundwater investigation will be conducted to determine if the TMP has affected groundwater quality. The groundwater investigation will examine both the perched water and bedrock aquifer. The investigation will be conducted after the pond has been drained to better represent conditions after the TMP has been closed. After the TMP is drained, any saturation observed at the fill/clay interface (i.e. at GMW-4) will not be due to the water in the TMP (and ADP), but due to infiltration of precipitation.

The investigation of the perched aquifer will install two new monitoring points in the perched aquifer (GMW-13 and GMW-14 in Figure 8). These wells will be installed to determine the depth of saturation around the TMP, and to determine the direction of flow (if any) in this zone. GMW-13 and GMW-14 will be installed in accordance with the standard operating procedures in the QAPP. Five foot screen sections will be placed above the clay layer.

During installation of monitoring wells GMW-13, GMW-14 and GMW-15, samples will be collected at the surface of the lacustrine clay layer. These samples will be analyzed for the metals COIs included in Table 3 in order to identify background concentrations at the Gibraltar facility. The background concentrations may be compared with concentrations in samples collected from the base of the TMP.

Although the thick clay layer is believed to have prevented any migration of constituents from the perched zone or the TMP to the bedrock aquifer, groundwater samples will be collected from existing bedrock monitoring wells near the TMP to verify this. As indicated in Section 2.2, the potentiometric surface of the bedrock aquifer around the TMP is nearly flat. Flow appears to be towards the north and east. One additional bedrock well (GMW-15) will be installed on the north side of the TMP, as shown in Figure 8, to replace GMW-9, which has apparently been destroyed. If groundwater elevation measurements indicate that flow is not to the north and east,

then the location of GMW15 may be revised. Any change will be submitted to MDEQ in writing, as a revision to this Work Plan.

Newly installed monitoring wells will be surveyed by a surveyor licensed in the State of Michigan, as described in the QAPP. The groundwater investigation will collect samples from the new wells GMW-13, GMW-14 and GMW-15, as well as existing monitoring wells GMW3, GMW4, GMW-4D, GMW5, GMW6, GMW7 and GMW8. Samples will be collected in accordance with the QAPP. Samples will be collected during two separate sampling events conducted at least two months apart. The first sampling event will take place no sooner than two weeks after installing the new monitoring wells.

6.0 Operation and Maintenance

The maintenance of the sediment cell will consist of mowing the grass and maintaining the gravel surface of unseeded areas. DSC personnel will inspect the pile for erosion on a quarterly basis, and repair any areas where erosion exposes the clay material. The cover will also be inspected for signs of burrowing animals, except when there is snow cover. Burrowing animals will be trapped and removed from the area.

DSC will conduct long-term monitoring of groundwater in the upper unconsolidated zone for five years after completing the sediment cell. Groundwater samples will be collected from shallow wells GMW-4, GMW-13, and GMW-14 once per year, and analyzed for SVOCs. DSC will measure water levels in the shallow monitoring wells and the bedrock monitoring wells, but will not collect groundwater samples from the bedrock wells.

Groundwater samples will be collected in accordance with the QAPP, and analyzed in accordance with the QAPP. The results of the annual sampling and water level measurements will be reported in the regular Consent Order progress reports.

After completing two years of the groundwater monitoring program, the bedrock wells around the Tandem Mill Pond will be abandoned. The unconsolidated zone wells will be abandoned after completing the groundwater monitoring program.

7.0 Data Analysis and Reporting Requirements

7.1 Analytical Subcontractor

Samples will be submitted to an environmental analytical laboratory listed in the QAPP for Consent Order activities. Upon receipt of a sample shipment, the laboratory's Project Manager will generate a status report of samples received, their condition, and the analytical requirements. The status report will be sent to the ESC QAO by telefax within 24 hours of receipt of the samples at the laboratory.

If samples are to be submitted to a laboratory not included in the QAPP, one copy of the laboratory QA/QC Plan will be provided to MDEQ prior to the start of the project. The submittal will also include a Qualifications Statement that identifies the laboratory project manager who would be responsible for overseeing all aspects of the project, and the other key laboratory personnel identified in the QAPP. The laboratory used will have current certification for soil and water analysis from the Michigan Department of Environmental Quality.

7.2 Data Uses and Quality Objectives

The chemical analytical data collected during the performance of the TMP corrective measure are intended for the following uses.

- to determine the effectiveness of soil treatment
- to identify any areas of soil or groundwater that exceed Part 201 criteria

A primary component of data quality is selection of the appropriate analytical level for the intended data use. The analytical levels, as described in "Data Quality Objectives for Remedial Response Activities" (U.S. Environmental Protection Agency [EPA], March 1987), are described in the QAPP. Analytical Data Quality Level III will be used for the corrective measure. All analyses performed in an off-site analytical laboratory. Level III analyses may or may not use Contract Laboratory Program (CLP) procedures but do not usually utilize the validation or documentation procedures required of CLP Level IV analysis. The laboratory may or may not be a CLP laboratory. Level III analytical protocol will be adhered to by the subcontract laboratory performing the analyses. The specific analytical methods are identified in Table A-1.

7.3 Analytical Parameters and Methods

Table 7 summarizes the analytical requirements for the water and soil samples to be collected during the Corrective Measure. Samples will be analyzed according the methods referenced in Table 7 and in accordance with the QAPP. Analytical methods are found in the EPA document, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," Third Edition, SW-846, November 1986, as revised and updated.

7.4 Quality Assurance/Quality Control

Analyses for this project will be performed in accordance with the procedures presented in the program QAPP and the subcontract laboratory's QA/QC Plan. Data quality will be measured for precision, accuracy, representativeness, completeness and comparability in accordance with the QAPP.

8.0 Reporting

The status of the TMP IRA will be reported regularly to MDEQ in the quarterly Consent Order progress reports. The confirmation sampling data will be included in the progress reports, as will the results of regular groundwater elevation measurements and the results of the groundwater investigation.

Upon completion of the IRA, an IRA report will be submitted to MDEQ. This report is not required by the Consent Order. The report will serve to organize all data related to the TMP in a single location. The IRA Report will include summary tables and analytical data for soil and water samples, including soil samples from the static pile. It will include boring logs and monitoring well construction diagrams. Final grading plans of the sediment pile and the TMP will also be included. The report will also detail any exceptions to the approved Work Plan.

9.0 Project Organization

The organizational structure for implementing the corrective measures is provided in Figure 12. DSC will retain a consultant to perform sampling, analysis and documentation services, including data management, and data evaluation and reporting. Analytical work will be conducted by Huron Valley Laboratories or by Tri-Matrix Laboratories, as described in the QAPP. Another analytical laboratory may be used to conduct the analysis if the laboratory quality assurance plan has been reviewed and approve by the MDEQ. The consultant and any contractors (i.e. well driller) will be selected following MDEQ approval of this Investigation Plan. The consultant and any contractors will report to the DSC Project Manager. DSC will submit a letter to MDEQ notifying them of any change in the specific personnel assigned to the project within 7 days of such a change.

9.1 Management Responsibilities

DSC Ltd. Project Coordinator – Dennis Zurakowski, P.E.

Mr. Zurakowski, the DSC Director Environmental, Health and Safety, has the overall responsibility for the corrective measures at the Gibraltar facility. All activities carried out under the Comprehensive Consent Order are under the overall direction of Mr. Zurakowski, including sampling and analysis activities and corrective measures. Mr. Zurakowski will manage the coordination and implementation of the investigation, provide senior technical and resource management support, and routinely evaluate compliance with the Consent Order and the approved Work Plan.

Mr. Zurakowski also serves as the Safety Manager for DSC Ltd. Mr. Zurakowski will ensure that all investigation activities are performed in accordance with the HASP. He will coordinate with the DSC Project Manager, the consultant health and safety officer, the site health and safety coordinator, and the Contractor health and safety officer regarding all procedures related to health and safety. The safety manager's responsibilities are described in the HASP.

DSC Project Manager

DSC will appoint a project manager who will be responsible for the day-to-day implementation of the Work Plan. The DSC project manager's duties will include, but not be limited to, procurement of contractors and consultants, and coordination of activities.

The Project Manager will inspect Contractor activities for compliance with the Comprehensive Consent Order, the QAPP, and the terms of the approved plan.

Consultant Project Director

The consultant will designate a project director responsible for ensuring that the investigation is performed in strict compliance with the approved Work Plan. The project director shall be a professional engineer or geologist with expertise in hazardous waste site investigation and cleanup. The project director will have the authority to commit the firm's resources to accomplish the project objectives. The director will be responsible for certifying that the investigation was completed in accordance with the requirements in the Consent Order and Section 6 of this Work Plan. The project director will report to the DSC Project Manager.

Consultant Project Manager

The consultant will appoint a project manager to be responsible for the day-to-day direction of the Work Plan activities. The project manager will have the responsibility and authority to procure the necessary support services and equipment for implementing the work. He has prime responsibility for scheduling, technical matters, and reporting all consultant activities. The project manager will report directly to the consultant project director.

Consultant Health and Safety Officer

The consultant shall designate a Health and Safety Officer responsible for ensuring that a site-specific Health and Safety Plan is prepared in accordance with the site HASP and federal and state requirements, and ensuring that it is followed by consultant personnel.

Consultant Quality Assurance Officer

The consultant shall designate a Quality Assurance Officer (QAO) who will be responsible for all QA/QC aspects of the work, including any sampling and analysis. The QAO will report to the Project Manager. The QAO will be responsible for meeting QA goals during investigations. The QAO will be responsible for ensuring that all contractors designate a project QAO where relevant and that each contractor complies fully with all aspects during each phase of the effort. In particular, the QAO will work closely with the QAOs of the drilling contractors and the analytical laboratory to ensure that all QA/QC requirements are being met. The QAO's overall responsibilities include, but are not limited to the following:

- field operations QC
- sampling QC

- laboratory QC
- data processing QC
- data quality review
- performance auditing
- systems auditing
- overall QA

Ultimate responsibility for project quality remains the responsibility of the contractor Project Manager. In particular, the Project Manager is responsible for ensuring QA for field operations and sampling, data quality review, and overall QA.

9.2 Laboratory Responsibilities

The laboratory designated to do the analytical work for this project has not been selected at this time. It is expected that one of the laboratories identified in the QAPP (Huron Valley Laboratories, TriMatrix Environmental) will perform all laboratory analysis. Analytical laboratory contact names, addresses, and phone number are included in Appendix G. A laboratory not named in the QAPP will not perform analysis work unless that laboratory's QA/QC plan is submitted to and approved by MDEQ.

Laboratory Project Manager

The laboratory Project Manager serves as the laboratory representative for day-to-day contacts. The laboratory Project Manager will report directly to the consultant's QAO and will be responsible for ensuring that the resources of the laboratory will be available on an as-required basis. The laboratory Project Manager will report to the QAO (or designee) to facilitate coordination of all planned sampling and chemical testing activities. The laboratory Project Manager will oversee the preparation of final analytical reports. The Huron Valley Project Manager will be Mr. Robert Lynch, the Laboratory Manager. The Tri-Matrix Project Manager will be Ms. Lisa Harvey.

Laboratory Operations Manager

The laboratory's operations manager will report to the laboratory's Project Manager and will be responsible for: coordinating laboratory analyses; supervising in-house chain-of-custody; scheduling sample analyses; overseeing data review; overseeing preparation of analytical reports; and approving final analytical reports prior to submission.

Laboratory Quality Assurance Officer (QAO)

The laboratory QAO will report directly to the consultant's QAO or Project Manager when corrective action is required as a result of compliance and performance audits.

Laboratory Sample Custodian

The laboratory sample custodian will report to the laboratory operations manager. The sample custodian will be responsible for: receiving and inspecting the incoming sample containers; recording the condition of the incoming sample containers; signing appropriate documents; verifying chain-of-custody and its correctness; notifying laboratory manager and laboratory supervisor of sample receipt and inspection; assigning a unique identification number and customer number, and entering each into the sample receiving log; initiating transfer of samples to the appropriate laboratory sections; and controlling and monitoring access/storage of samples and extracts.

9.3 Field Responsibilities

Field Team Leader

The field team leader is responsible for leading and coordinating the day-to-day activities of the various resource specialists under her supervision, including contractor personnel. The individual performing the tasks required of the field team leader may change throughout the completion of the investigation. The field team leader is a highly experienced environmental professional and will report directly to the consultant Project Manager. Specific field team leader responsibilities include:

- providing day-to-day coordination with the consultant Project Manager on technical issues in specific areas of expertise
- day-to-day coordination with the DSC Project Manager
- implementing field tasks described in this Work Plan, assuring schedule compliance, and adhering to the procedures in this Work Plan, the QAPP and the HASP
- coordinating and managing field staff including sampling, drilling, and supervising field laboratory staff
- field documentation and recordkeeping

- implementing QC for technical data provided by the field staff including field measurement data
- adhering to work schedules provided by the Project Manager
- authoring, writing, and approving text and graphics required for field team efforts
- coordinating and overseeing efforts of subcontractors assisting the field team
- identifying problems at the field team level, resolving difficulties in consultation with the Project Manager, implementing and documenting corrective action procedures, and communicating between team and upper management
- participating in preparation of the final report

Field Technical Staff

The field technical staff (team members) for this project will be drawn from the resources of DSC, the consultant, contract laboratory, and subcontractors. The field technical staff will gather and analyze data. All of the designated technical team members will be experienced professionals with the degree of specialization and technical competence required to perform the required work effectively and efficiently.

Site Health and Safety Officer

The site specific health and safety officer will be responsible for the following:

- ensuring that all site activities are performed in accordance with the HASP
- ensuring that all site activities are performed in a safe manner to eliminate danger to personnel performing the field activities
- providing guidance to the injured for immediate medical attention
- filing personnel injury reports to the Project Manager

The site health and safety officer is responsible for monitoring activities onsite and ensuring that employees are properly implementing the HASP. Specific duties of the health and safety coordinator include performing personal air monitoring (screening), observing activities conducted by employees, and maintaining notes concerning site activities in relation to personnel safety (e.g., air monitoring results, excavation activities).

The DSC Health and Safety Officer and the consultant Corporate Health and Safety Officers are also responsible for ensuring that all field activities are conducted in accordance with the HASP.

9.4 Contractor Responsibilities

Contractor Project Manager

The contractor will appoint a project manager who will be responsible for the day-to-day implementation of the contracted corrective measures. The Project Manager will be responsible for ensuring that corrective measures are conducted in accordance with the CCARCO and the terms of the approved Work Plan. The contractor's project manager shall have prior experience in operations within zones of contaminated soil. The project manager will have the responsibility and authority to procure the necessary support services and equipment for implementing the investigation. He has prime responsibility for scheduling, technical matters, and reporting all consultant activities.

Contractor Health and Safety Officer

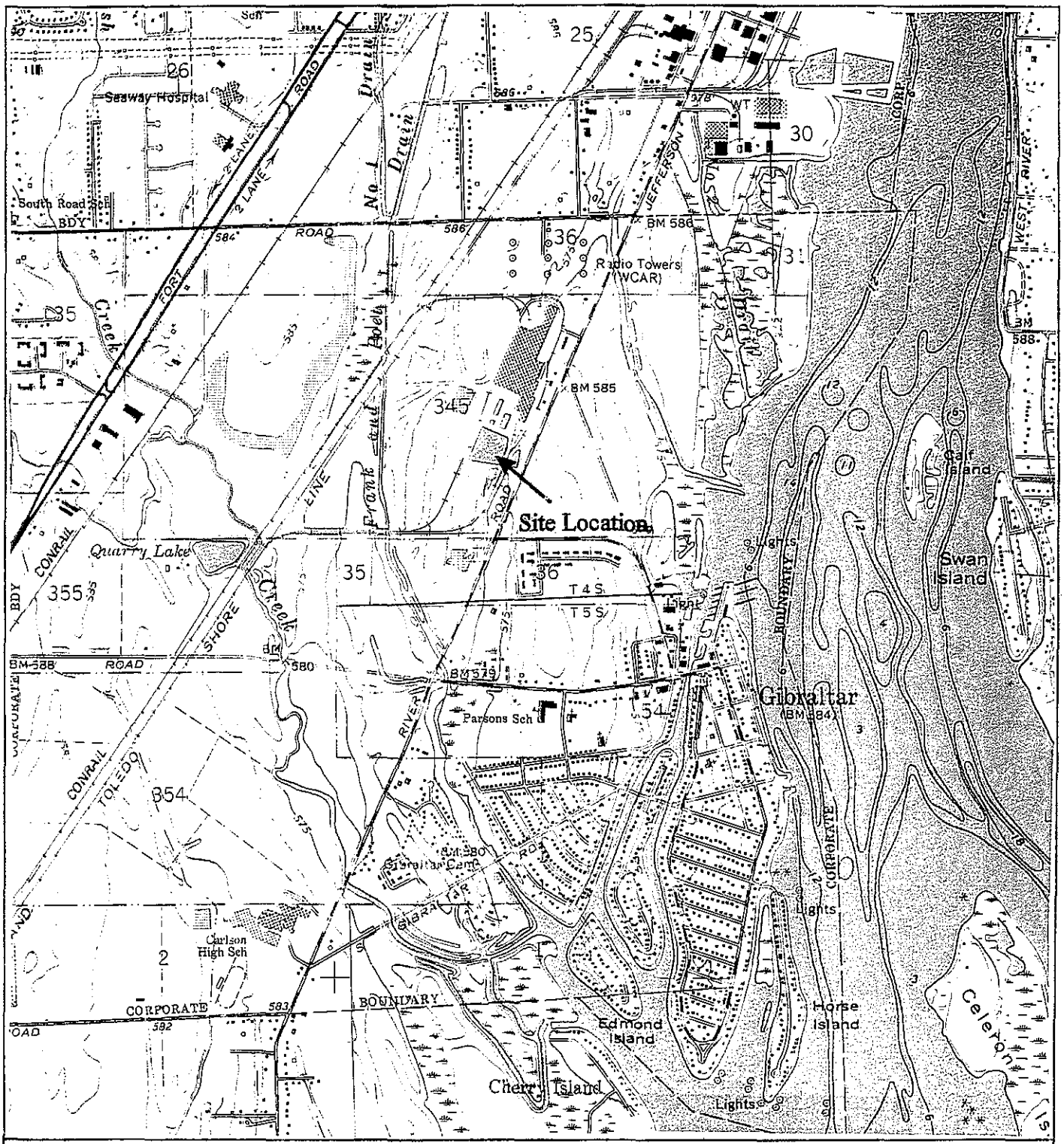
The contractor shall designate a Health and Safety Officer responsible for ensuring that a site-specific Health and Safety Plan is prepared in accordance with the site HASP and federal and state requirements, and ensuring that it is followed by contractor personnel.

10.0 Project Schedule

It is expected that the TMP IRA will be completed in 2002. The TMP will be drained and soil and sediment consolidated in the sediment cell during 2001 and 2002. After soil and sediment from each area are placed in the sediment cell, an interim cover will be placed on the material. Placement of the final cover may not occur until 2002.

Groundwater investigation activities are expected to be completed during 2001.

Figures



Reference

Rockwood Topographic Quadrangle
Michigan - Ontario
Photorevised 1981 Scale 1:24,000

Quadrangle Location

0 2000 4000
Scale in Feet

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Reston, Virginia 20190
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Figure 1
Site Location
Tandem Mill Pond
DSC Ltd.
Gibraltar, Michigan

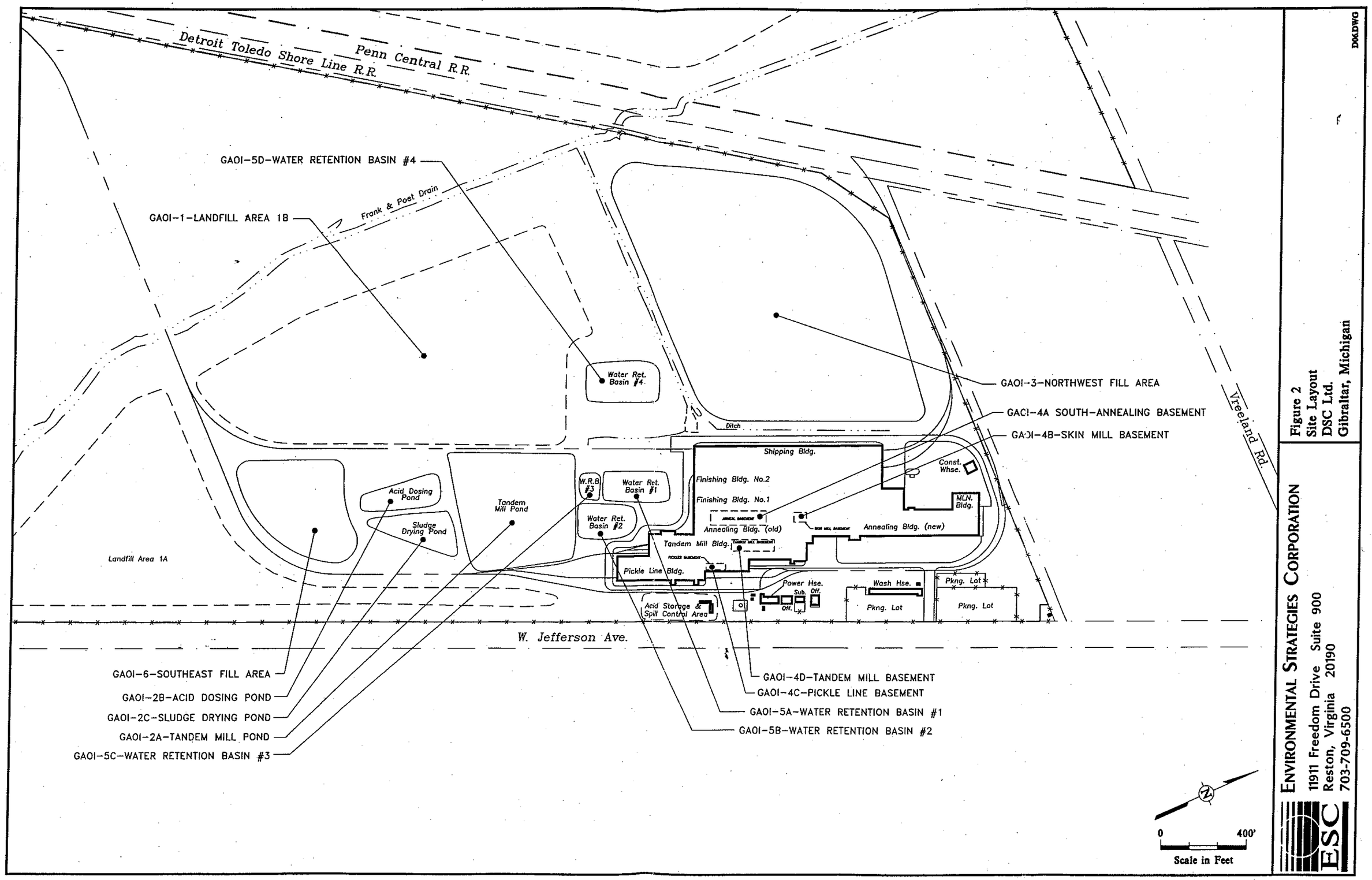

Figure 2
Site Layout
DSC Ltd.
Gibraltar, Michigan

DMKDWG

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ESC

GAOI-1-LANDFILL AREA 1B

GAOI-3-NORTHWEST FILL AREA

GAOI-5D-WATER RETENTION BASIN #4

TO OUTFALL 01B

GAOI-5C-WATER RETENTION BASIN #3

GAOI-4E-SLITTER BASEMENT (SUMP DISCHARGE DISCONTINUED 8/99)

GAOI-4A-SOUTH ANNEAL BASEMENT (SUMP DISCHARGE DISCONTINUED 8/99)

GAOI-4D-TANDEM MILL BASEMENT (SUMP DISCHARGE DISCONTINUED 8/99)

GAOI-4B-SKIN MILL BASEMENT

Ditch

Shipping Bldg.

Const.

Whse.

SPENT ACID (BATCH)
(MCLOUTH ONLY DISCONTINUED 1996)

LANDFILL 1B
LEACHATE
DISCHARGE
(ONGOING)

ADP FEED/OVERFLOW
(ONGOING)

GAOI-2B-ACID DOSING POND

GAOI-2A-TANDEM MILL POND

GAOI-2C-SLUDGE DRYING POND

LANDFILL 1A
LEACHATE
DISCHARGE
(ONGOING)

Finishing Bldg. No.2

Finishing Bldg. No.1

'C' ANNEAL

NORTH ANNEAL

GAOI-4F-ROLL SHOP SUMP

Annealing Bldg. (old)

Annealing Bldg. (new)

Tandem Mill Bldg.

Pickle Line Bldg.

Power Hse.

Sub.

Off.

Off.

Wash Hse.

Pkng.

Pkng. Lot

CAUSTIC ADDITION

Acid Storage &
Spill Control Area

GAOI-5B-WATER RETENTION BASIN #2

GAOI-5A-WATER RETENTION BASIN #1

GAOI-4C-PICKLE LINE BASEMENT

W. Jefferson Ave.

LEGEND

HISTORICAL DISCHARGES TO TANDEM MILL POND

ONGOING HISTORICAL FLOWS IN WASTEWATER TREATMENT SYSTEM

ONGOING BASEMENT SUMP DISCHARGES ARE ONLY FOR EASE OF COLLECTION. NO SUMP DISCHARGES DIRECTLY TO TANDEM MILL POND AS OF 8/99.

0 200'

Scale in Feet

Figure 3
Wastewater Flow Diagram
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gilbraltar, Michigan

DSCG002A.DWG

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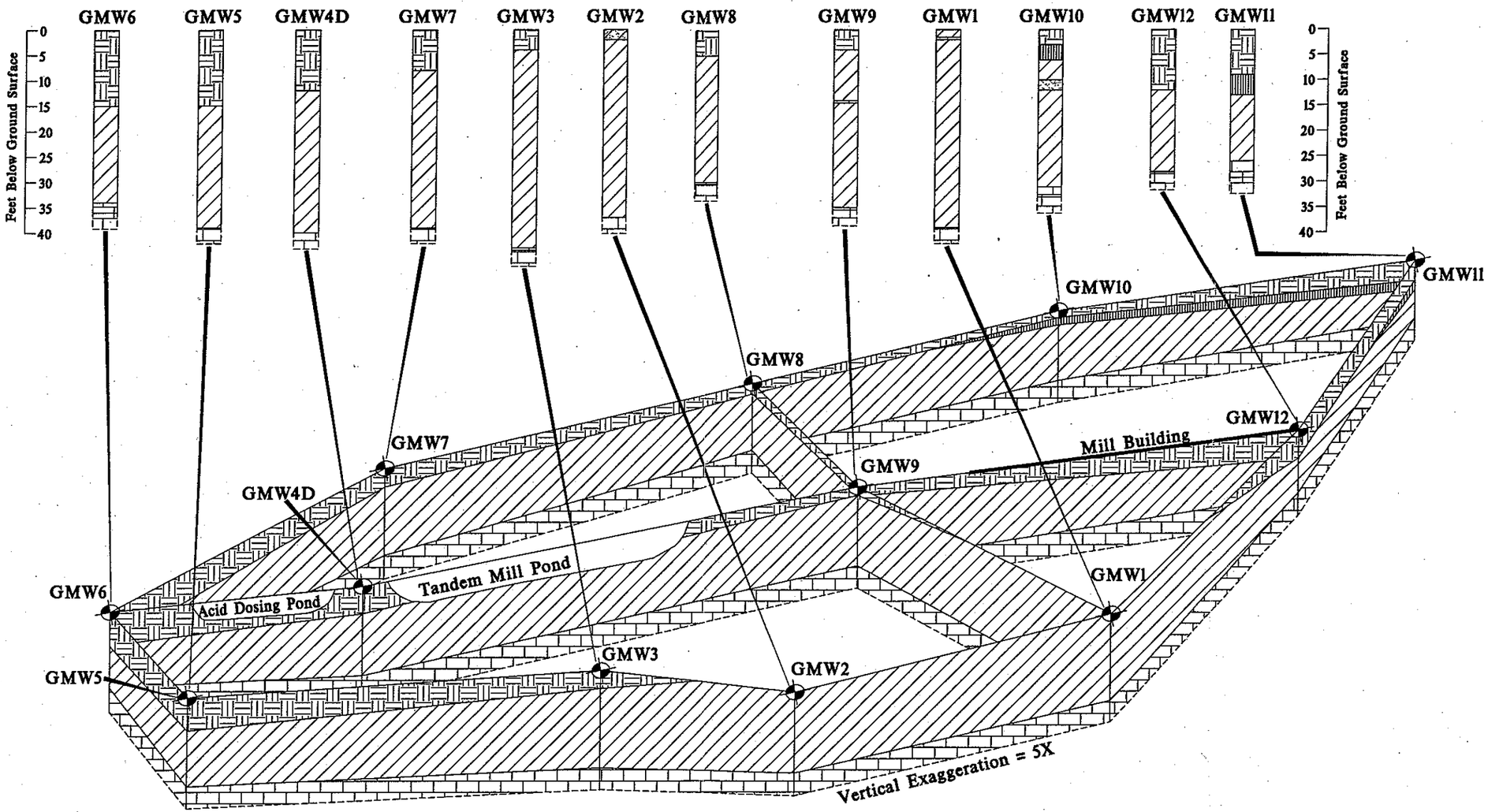

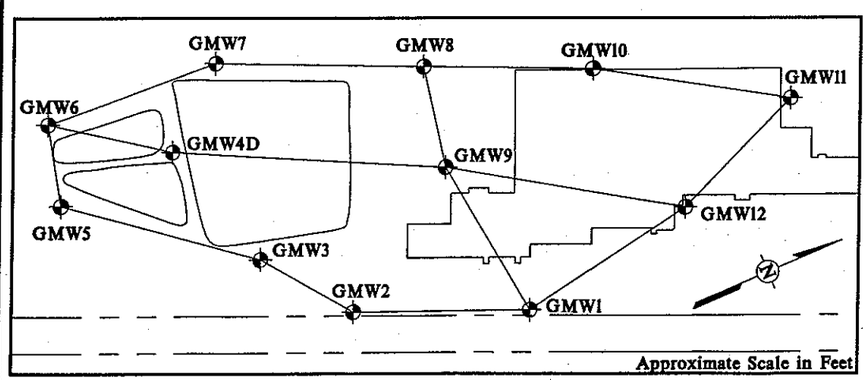

Legend

- Fill
- Silt
- Sand
- Clay
- Clayey Sand
- Limestone

N

0 40'

Approximate Vertical Scale in Feet

0 200'

Approximate Horizontal Scale in Feet

Figure 4
Fence Diagram
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gilbraltar, Michigan

FENCE.DWG

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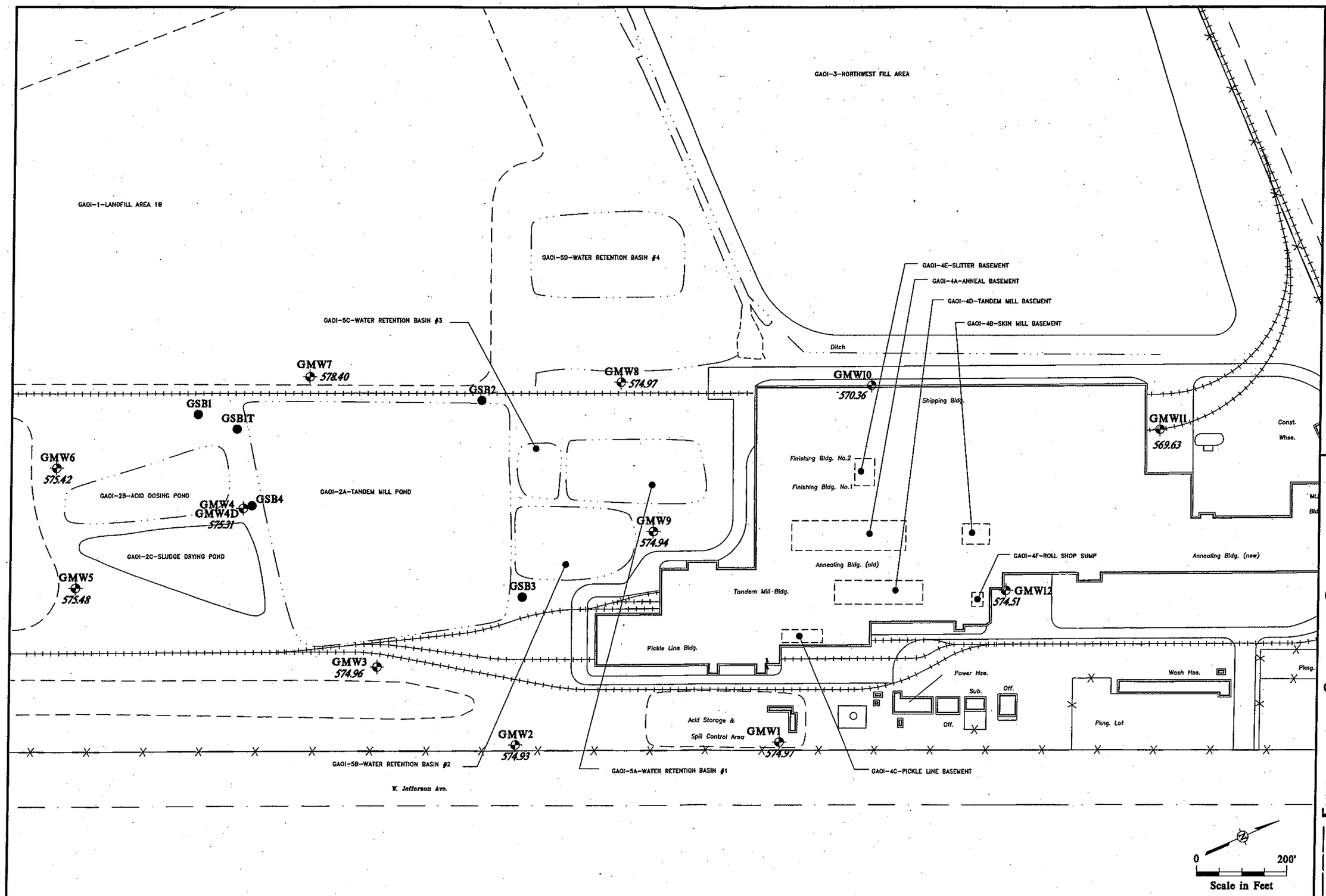

Figure 5
Potentiometric Surface in Limestone Bedrock (08/08/97)
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gilbraltar, Michigan

DSCG001.DWG

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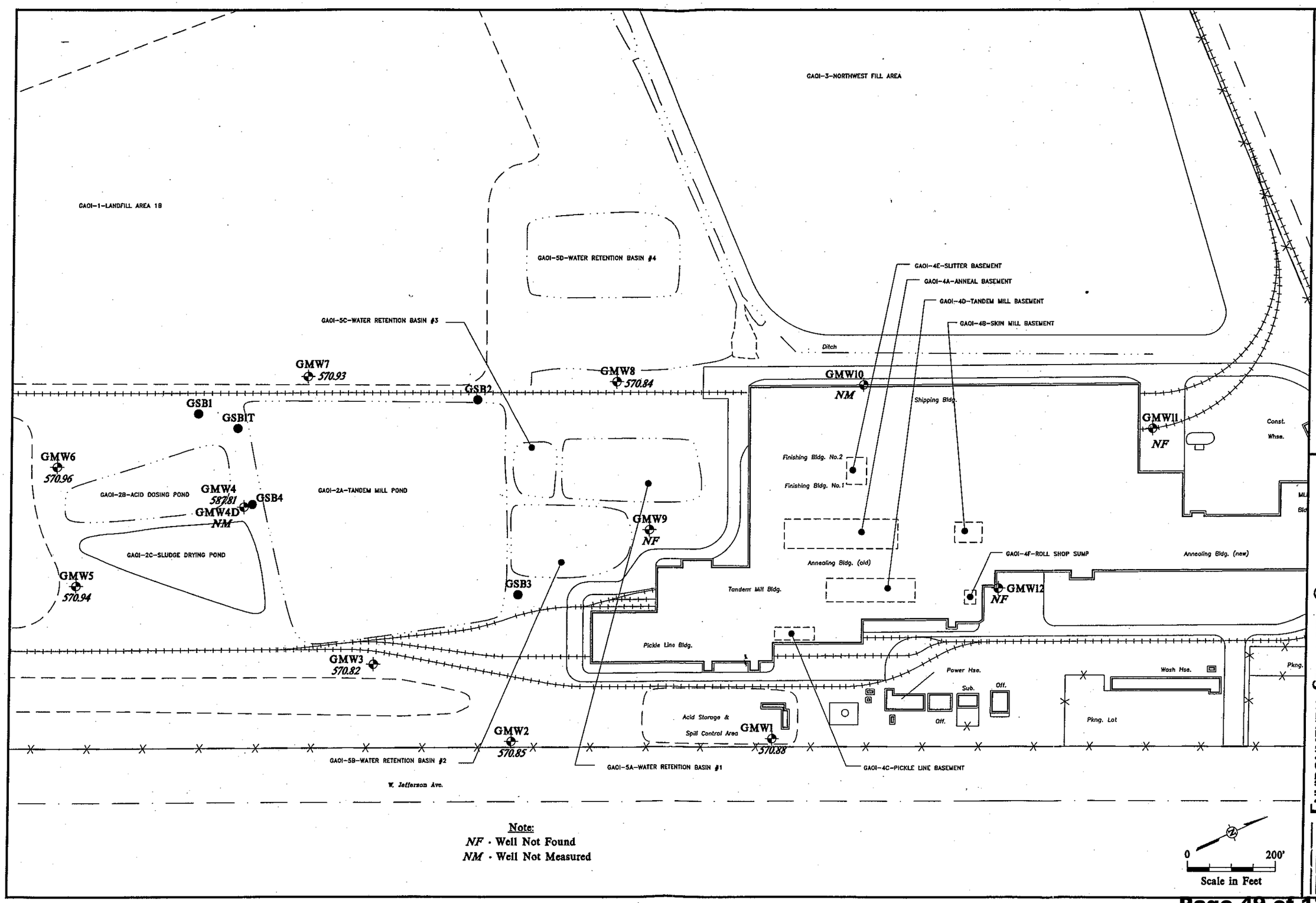

Note:
NF - Well Not Found
NM - Well Not Measured

Figure 6
Potentiometric Surface in Limestone Bedrock (01/20/00)
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gilbraltar, Michigan

DSCG001A.DWG

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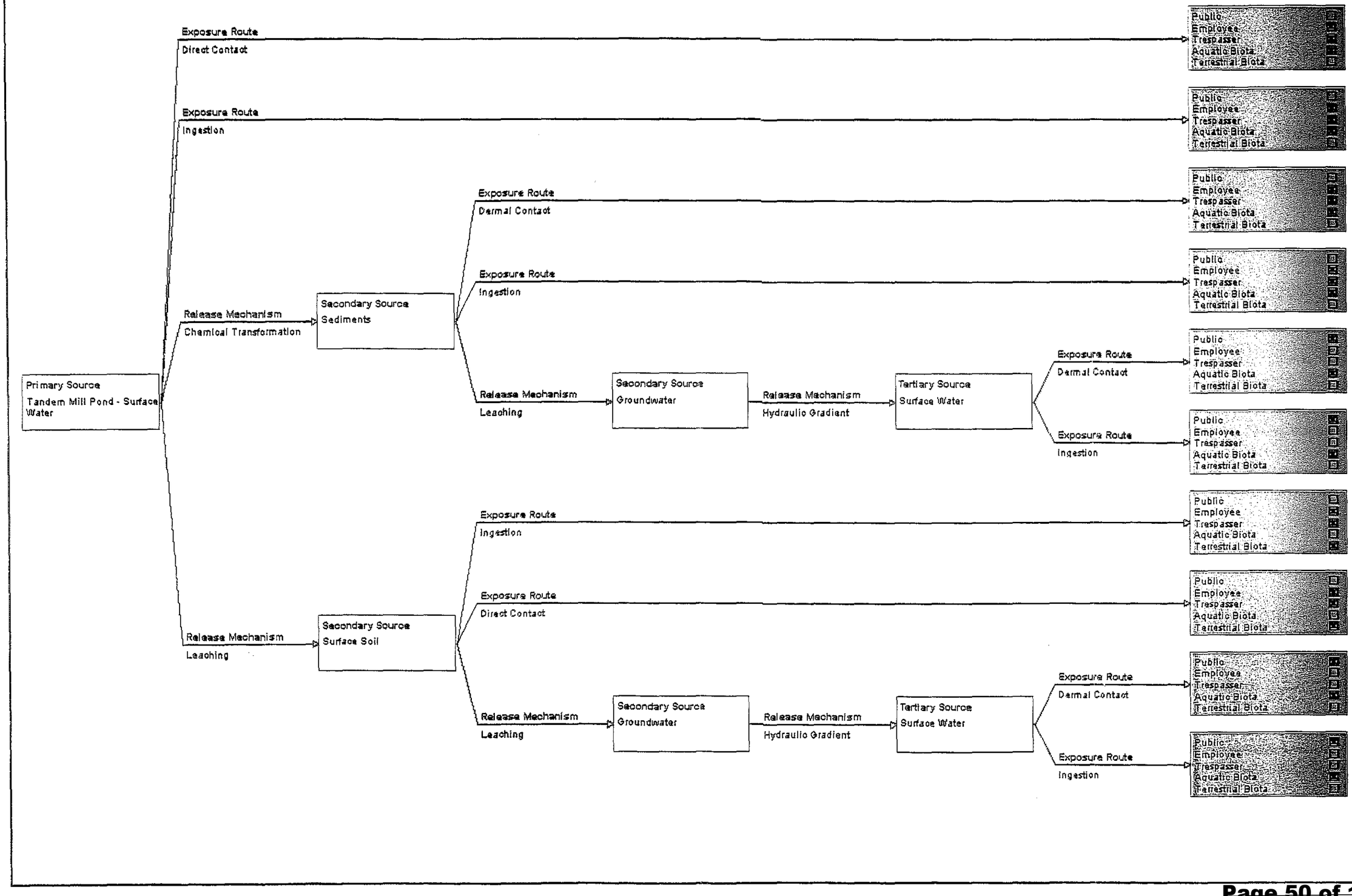
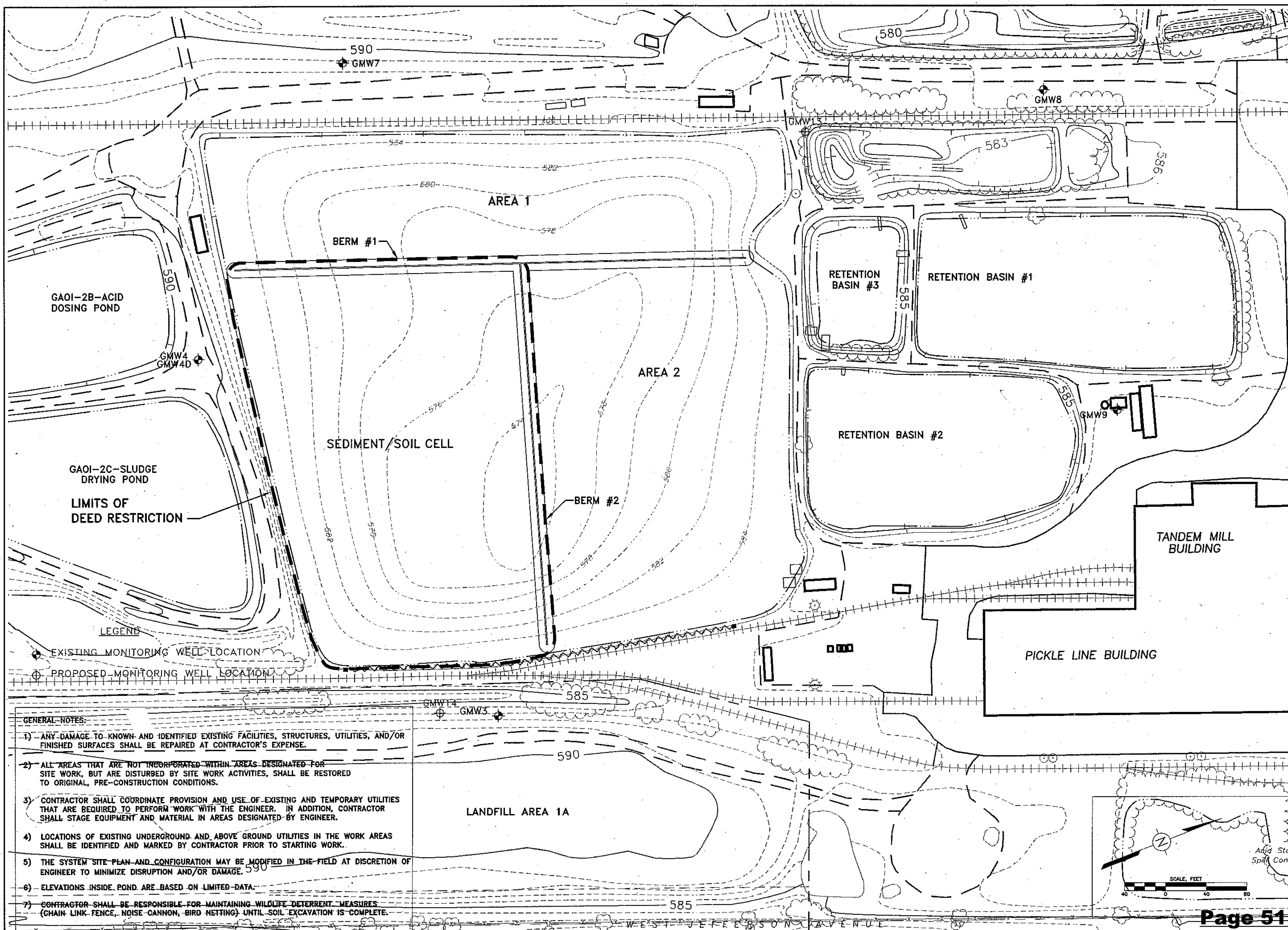


Figure 7
Conceptual Site Model
Tandem Mill Corrective Measures Work Plan
DSC Ltd.
Trenton, Michigan

CSM.CDR

ENVIRONMENTAL STRATEGIES CORPORATION
FOUR PENN CENTER WEST, SUITE 315
PITTSBURGH, PA 15276
412-787-5100
ESC



LEGEND

EXISTING MONITORING WELL LOCATION

PROPOSED MONITORING WELL LOCATION

GENERAL NOTES:

1) ANY DAMAGE TO KNOWN AND IDENTIFIED EXISTING FACILITIES, STRUCTURES, UTILITIES, AND/OR FINISHED SURFACES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.

2) ALL AREAS THAT ARE NOT INCORPORATED WITHIN AREAS DESIGNATED FOR SITE WORK, BUT ARE DISTURBED BY SITE WORK ACTIVITIES, SHALL BE RESTORED TO ORIGINAL, PRE-CONSTRUCTION CONDITIONS.

3) CONTRACTOR SHALL COORDINATE PROVISION AND USE OF EXISTING AND TEMPORARY UTILITIES THAT ARE REQUIRED TO PERFORM WORK WITH THE ENGINEER. IN ADDITION, CONTRACTOR SHALL STAGE EQUIPMENT AND MATERIAL IN AREAS DESIGNATED BY ENGINEER.

4) LOCATIONS OF EXISTING UNDERGROUND AND ABOVE GROUND UTILITIES IN THE WORK AREAS SHALL BE IDENTIFIED AND MARKED BY CONTRACTOR PRIOR TO STARTING WORK.

5) THE SYSTEM SITE PLAN AND CONFIGURATION MAY BE MODIFIED IN THE FIELD AT DISCRETION OF ENGINEER TO MINIMIZE DISRUPTION AND/OR DAMAGE.

6) ELEVATIONS INSIDE POND ARE BASED ON LIMITED DATA.

7) CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING WILDLIFE DETERRENT MEASURES (CHAIN LINK FENCE, NOISE CANNON, BIRD NETTING) UNTIL SOIL EXCAVATION IS COMPLETE.

REVISIONS

REV	DESCRIPTION		
1	Revised:	Chkd:	Appr:
2	Revised:	Chkd:	Appr:
3	Revised:	Chkd:	Appr:

SEAL

DATE

DRAWN BY EGC

CHECKED

APPROVED

EXCAVATION PLAN
TANDEM MILL POND

DSC LTD.
GIBRALTAR, MICHIGAN

PREPARED FOR
DSC LTD.
TRENTON, MICHIGAN

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Suite 900
Reston, Virginia 20190
(703) 709-6500

SHEET 8

Drawing Number
19304709

590
GMW7
580
GMW8
GMW13
583
586
AREA 1
BERM #1
RETENTION BASIN #3
RETENTION BASIN #1
585
GAOI-2B-ACID DOSING POND
590
GMW4
GMW4D
AREA 2
SEDIMENT/SOIL CELL
RETENTION BASIN #2
585
GMW9
GAOI-2C-SLUDGE DRYING POND
LIMITS OF DEED RESTRICTION
BERM #2
TANDEM MILL BUILDING
PICKLE LINE BUILDING
LEGEND
EXISTING MONITORING WELL LOCATION
PROPOSED MONITORING WELL LOCATION
GMW14
GMW3
585
590
LANDFILL AREA 1A
590
585
WEST JEFFERSON AVENUE
Acid Stor
Spill Contr
SCALE, FEET
40 0 40 80

GENERAL NOTES:

1) ANY DAMAGE TO KNOWN AND IDENTIFIED EXISTING FACILITIES, STRUCTURES, UTILITIES, AND/OR FINISHED SURFACES SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE.

2) ALL AREAS THAT ARE NOT INCORPORATED WITHIN AREAS DESIGNATED FOR SITE WORK, BUT ARE DISTURBED BY SITE WORK ACTIVITIES, SHALL BE RESTORED TO ORIGINAL, PRE-CONSTRUCTION CONDITIONS.

3) CONTRACTOR SHALL COORDINATE PROVISION AND USE OF EXISTING AND TEMPORARY UTILITIES THAT ARE REQUIRED TO PERFORM WORK WITH THE ENGINEER. IN ADDITION, CONTRACTOR SHALL STAGE EQUIPMENT AND MATERIAL IN AREAS DESIGNATED BY ENGINEER.

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REVISIONS

REV	DESCRIPTION	APP'D
1	Revised	CHAE
2	Revised	CHAE
3	Revised	CHAE

DRAWN BY EGC
CHECKED
APPROVED

SEAL

DATE

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER. ALTERATIONS TO THIS DRAWING MADE BY ANY PERSON UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT ARE INVALID.

SAMPLE LOCATIONS GRID
TANDEM MILL POND
DSC LTD.
GIBRALTAR, MICHIGAN

PREPARED FOR
DSC LTD.
TRENTON, MICHIGAN

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SHEET 9

Project Number
19304709

590
GMW7
580
GMW13
583
584
582
580
AREA TO BE
DEED RESTRICTED
578
590
GAOI-2B-ACID
DOSING POND
GMW4
GMW4D
583
584
585
574
576
586
586
588
582
586
588
582
GAOI-2C-SLUDGE
DRYING POND
LIMITS OF
DEED RESTRICTION
RETENTION
BASIN #3
585
RETENTION
BASIN #1
RETENTION BASIN #2
LEGEND
EXISTING MONITORING WELL LOCATION
PROPOSED MONITORING WELL LOCATION
GMW14
GMW3
585
590
LANDFILL AREA 1A
590
585
WEST JEFFERSON AVENUE
N
SCALE, FEET
40 0 40 80

SEED AND MULCH TOPSOIL AREAS
GRAVEL OR TOPSOIL
CLAY
CONSOLIDATED SOIL AND SEDIMENT
MIXED WITH FLY ASH (25% BY WEIGHT)
NATIVE CLAY

SEDIMENT/SOIL CELL CROSS-SECTION
NOT TO SCALE

REVISIONS
REV | DESCRIPTION | DRAWN | APPD | DATE
1 | Revised | DRAWN | APPD | DATE
2 | Revised | DRAWN | APPD | DATE
3 | Revised | DRAWN | APPD | DATE

SEAL

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FINAL CONTOURS
TANDEM MILL POND
DSC LTD.
GIBRALTAR, MICHIGAN
PREPARED FOR
DSC LTD.
TRENTON, MICHIGAN

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Suite 900
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SHEET 10

Project Number
10514709

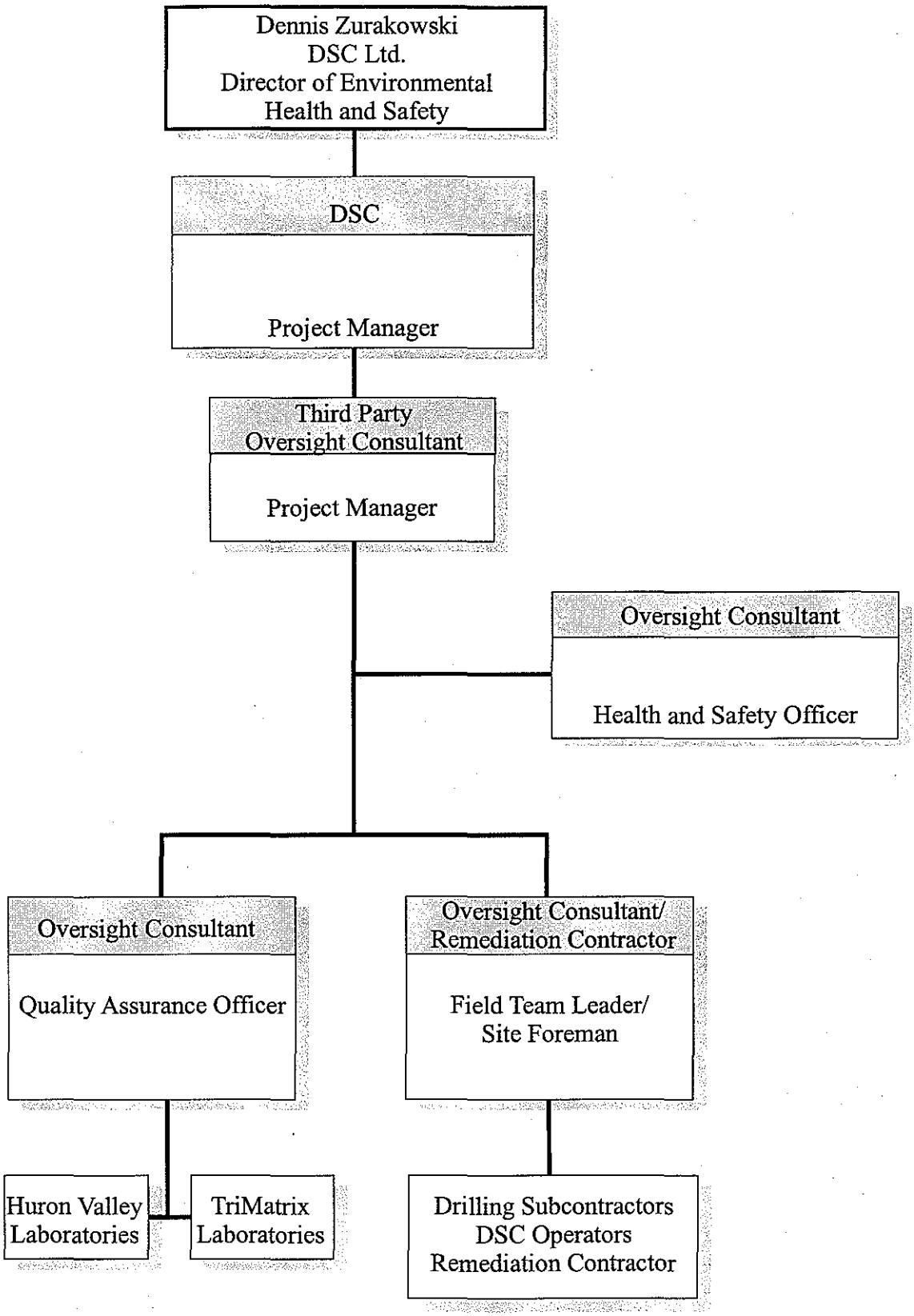

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Figure 11
Project Organization - Corrective Measures
DSC, Ltd.
Trenton and Gibraltar, Michigan

DSC01.CDR

Tables

Table 1
Sediment Sampling Results Summary
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gibraltar MI (a)

	Area 1 Composite	SW composite		NE composite	
Sample Date	04/26/2001	12/12/1997		12/12/1997	
	[mg/kg]	[mg/kg]		[mg/kg]	
Compound					
Semi-Volatile Organic Compounds (8260)					
2,4-Dimethylphenol	6.1	100	ND	105 (GSI)	
Phenol	4.1	100 (GSI)		158 (GSI)	
Anthracene	8.7	100	ND	100	ND
Fluoranthene	8.6 (GSI)	100	ND	100	ND
Fluorene	75 (GSI)	100	ND	100	ND
Naphthalene	5.4 (GSI)	100	ND	100	ND
Phenanthrene	100 (GSI, Ambient air)	100	ND	100	ND
Pyrene	18	100	ND	100	ND
Metals (Method 6020 except as noted)					
Arsenic	NA	52.4 (GSI)		58.1 (GSI)	
Barium	NA	128		153	
Cadmium	NA	1.18		1.02	
Chromium	NA	52.3		54.6	
Copper	NA	951 (GSI)		919 (GSI)	
Lead	NA	94.9		99.7	
Mercury (Method 7471)	NA	0.1	ND	0.1	ND
Selenium	NA	0.5	ND	0.5	ND
Silver	NA	0.49		0.43	
Zinc	NA	1640 (GSI)		1680 (GSI)	
Oil & Grease (413.1)	NA				
Oil & Grease		746000		697000	

a\ All results in mg/kg.
Shaded cells indicate that concentation detected is greater than one or more generic industrial Part 201 criteria.
The type of criteria exceeded is indicated in parentheses.

Table 2
Groundwater Sampling Results Summary
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gibraltar MI (a)

	GMW4		GMW4D		GMW7		Pond Sediment TCLP Results	
Sample Date	08/08/1997		08/08/1997		08/08/1997		12/12/1997	
	[mg/l]		[mg/l]		[mg/l]		[mg/l]	
Compound								
Semi-Volatile Organic Compounds (8260)								
2,4-Dimethylphenol	1.52 (GSI)		0.01	ND	0.07		NA	
Phenol	0.43 (GSI)		0.01	ND	0.04		NA	
Metals (Method 6020 except as noted)								
Arsenic	0.001	ND	0.001	ND	0.001	ND	0.005	ND
Barium	0.2		0.02		0.02		0.71 (GSI)	
Cadmium	0.0002	ND	0.0002	ND	0.0002	ND	0.001	ND
Chromium	0.01	ND	0.01	ND	0.01	ND	0.03	
Copper	0.06 (GSI)		0.01	ND	0.01	ND	0.18 (GSI)	
Lead	0.003	ND	0.003	ND	0.003	ND	0.003	ND
Mercury (Method 7471)	0.0002	ND	0.0002	ND	0.0002	ND	0.0002	ND
Selenium	0.005	ND	0.005	ND	0.005	ND	0.005	ND
Silver	0.0005	ND	0.0005	ND	0.0005	ND	0.001	ND
Zinc	0.01		0.01		0.02		0.77 (GSI)	

a\ All results in mg/l
Shaded cells indicate that the concentration detected exceeds the Part 201 GSI criteria (Appendix F)
The type of criteria exceeded is indicated in parentheses.
NA - Not Analyzed

Table 3
Constituents of Interest
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gibraltar MI

Constituent	
2,4-Dimethylphenol	X
Phenol	X
Fluoranthene	X
Fluorene	X
Naphthalene	X
Phenanthrene	X
Arsenic	X
Barium	X
Cadmium	X
Copper	X
Lead	X
Magnesium	X
Manganese	X
Nickel	X
Zinc	X

X - indicates that samples from the listed WMU will be analyzed for the constituent.

Table 4
Part 201 Industrial Criteria for Water
DSC Ltd.
Trenton and Gibraltar MI

Part 201 Generic Cleanup Criteria and Screening Levels: Industrial

Compound	Drinking Water Criteria [mg/l]	GW/SW Interface Criteria [mg/l]	Volatilization to Indoor Air Inhalation [mg/l]	Groundwater Contact Criteria [mg/l]	Background Concentration [mg/l]	Groundwater Criteria for Corrective Measure [mg/l]	Basis of Water Criteria
2,4-Dimethylphenol	NA	0.012	NLV	440	NA	0.012	GSI
Phenol	NA	0.21	NLV	28000	NA	0.21	GSI
Arsenic [b]	NAP	0.05 (b)	NLV	4.7	NA	0.05	GSI (SWDWV)
Barium	NAP	0.19	NLV	15,000	NA	0.19	GSI
Cadmium [b]	NAP	0.0025 (b)	NLV	210	NA	0.0025	GSI (SWDWV)
Copper [a]	NAP	0.013 (a)	NLV	8,100	NA	0.013	GSI
Lead [a]	NAP	0.0113 (a)	NLV	ID	NA	0.0113	GSI (FCV)
Magnesium	NAP	NA	NLV	1,000,000	NA	1,000,000	Direct contact
Manganese [a]	NAP	0.37 (a)	NLV	10,000	NA	0.37	GSI (FCV)
Nickel [a]	NAP	0.144 (a)	NLV	16,000	NA	0.14	GSI (FCV)
Zinc [a]	NAP	0.248 (a)	NLV	70,000	NA	0.25	GSI (FCV)

ID - Inadequate data to develop criterion
NA - Not Available
NAP - Not Applicable. Drinking water protection criteria are not included as the surface aquifer is not a potential drinking water source.
NLV - Not Likely to Volatilize
[a] GSI criteria is equal to freshwater **chronic** value (FCV) water quality criteria, based on H = 100 mg/l in accordance with Part 201 table Footnote G and current MDEQ practice. (No T)
[b] GSI criteria is equal to the surface water drinking water value (SWDWV) in accordance with part 201 criteria table Footnotes G and X.

Table 5
Part 201 Industrial Criteria for Soil
DSC Ltd.
Trenton and Gibraltar MI

Part 201 Generic Cleanup Criteria and Screening Levels: Industrial

Compound	GW/SW Interface Protection [mg/kg]	GW Contact Protection [mg/kg]	Particulate Soil Inhalation [mg/kg]	Direct Contact [mg/kg]	Statewide Default Background Levels [mg/kg]	Soil Criteria for Corrective Measure [mg/kg]	Basis of Soil Criteria
2,4-Dimethylphenol	0.33	8,800	2,100,000	230,000	NA	0.33	GSI
Phenol	4.20	12,000	18,000,000	12,000	NA	4.20	GSI
Arsenic [b]	16	2,200	910	100	5.80	16	GSI
Barium	130	1,000,000	150,000	320,000	75	130	GSI
Cadmium [b]	18.30	250,000	2,200	2,300	1.20	18.30	GSI
Copper [a]	653	1,000,000	59,000	170,000	32	653	GSI
Lead [a]	17.40	ID	44,000	900 (draft)	21	21	Background
Magnesium	NA	1,000,000	2,900,000	1,000,000	NA	1,000,000	Direct contact
Manganese [a]	41	200,000	1,500	210,000	440	440	Background
Nickel [a]	467	1,000,000	16,000	340,000	20	467	GSI
Zinc [a]	224	1,000,000	ID	1,000,000	47.00	224	GSI

Part 201 volatilization criteria are not included as constituents are not volatile or not likely to volatilize.
Part 201 drinking water protection criteria are not included as the surface aquifer does not have sufficient volume to represent a potential drinking water source.
ID - Inadequate data to develop criterion
NA - Not Available

[a] GSI criteria is equal to freshwater **chronic** value (FCV) water quality criteria, based on H = 100 mg/l in accordance with Part 201 table Footnote G and current MDEQ practice. (No T)

[b] GSI criteria is calculated from the surface water drinking water value (SWDWV), which is less than the FCV, in accordance with part 201 criteria table Footnotes G and X.

Table 6

Summary of Sampling and Analytical Requirements
Tandem Mill Pond Corrective Measures Work Plan
DSC Ltd.
Gibraltar, Michigan

Sample Location	Sample Description	Estimated No. of Samples (a)	Sampling Rationale	Required Analysis	Analytical Methodology (b)	Sample Containers	Preservatives
Tandem Mill Pond GAOI-2	Pretreatment System Discharge to Retention Basin	1/week	Pretreatment System Performance	FOG SVOCs Ammonia (daily) pH (continuous)	413.2 8270 Field test kit	1-8 oz. glass jar 1-8 oz. glass jar	Cool to 4° C Cool to 4° C
	Base of TMP Verification Samples	Up to 51 locations	Delineate extent of excavation. Cleanup criteria evaluation	Metals (Table 3) (c) SVOCs TPH PCBs (5 samples)	6010/7000 series 8270 418.1 8082	1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar	Cool to 4° C Cool to 4° C Cool to 4° C Cool to 4° C
	Soil/Sediment Pre-Mixing Samples	6 samples	Baseline for Treatment	SVOCs Metals (Table 3) (c) TPH VOCs (50% of samples)	8270 6010/7000 series 418.1 8260	1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar	Cool to 4° C Cool to 4° C Cool to 4° C Cool to 4° C
	Soil/Sediment Post-Mixing Samples	6 samples	Document material in sediment cell	SVOCs Metals (Table 3) Metals by SPLP TPH VOCs (if present initially)	8270 6010/7000 series 1311/6010/7000 series 418.1 8260	1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar 1-8 oz. glass jar.	Cool to 4° C Cool to 4° C Cool to 4° C Cool to 4° C Cool to 4° C
	Soil Borings (MW-13, MW-14, MW-15)	3	Clay Layer Background	Metals (Table 3)	6010/7000 series	1-8 oz. glass jar	Cool to 4° C
	Groundwater (Round 1)	10	Site Assessment	Metals (Table 3) (d) SVOCs pH	6010/7000 series 8270	1, 1-liter polyethylene bottle 1, 1-liter amber glass bottle	pH < 2, HNO_3 Cool to 4° C
	Groundwater (Round 2)	10	Site Assessment	Metals (Table 3) (d) SVOCs pH	6010/7000 series 8270	1, 1-liter polyethylene bottle 1, 1-liter amber glass bottle	pH < 2, HNO_3 Cool to 4° C

a/ Does not include QA/QC samples, which will be collected at the frequencies required in the QAPP.

b/ All methods from "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," 3rd ed., SW-846, November 1986 as revised and updated.

c/ Collect 0-6 and 6-12 inch samples at each location. If total metals concentrations are greater than Part 201 criteria, soil samples will be extracted by Method 1311 (SPLP) and the leachate analyzed for metals.

d/ Filtered and unfiltered groundwater samples will be collected for metals analysis.

Appendix A – USEPA 7003 Order for Tandem Mill Pond

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF
DE-9J

DUPLICATE

JUN 2 2 1999

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Michael Wilkinson, President
DSC Ltd.
1491 W. Jefferson Avenue
Trenton, MI 48183

Re: Issuance of Administrative Order Pursuant to Section 7003(a) of the Solid Waste Disposal Act, as amended, 42 U.S.C. § 6973(a)

Dear Mr. Wilkinson:

Enclosed please find an Administrative Order issued by the United States Environmental Protection Agency ("EPA") pursuant to Section 7003(a) of the Solid Waste Disposal Act, as amended ("RCRA"), 42 U.S.C. § 6973(a) ("Order"). This Order requires that DSC Ltd., take immediate and long-term measures to stop the exposure of migratory birds to solid wastes at the Gibralter, Michigan facility. The particular area of concern, as identified by an employee of the U.S. Fish and Wildlife Services, is known as the Tandem Mill Pond.

The Order requires that you begin the Work to be Performed within five days of receipt of this Order. Failure to notify EPA within this time frame of your intent regarding compliance with this Order shall be construed as a refusal to comply. Such refusal or failure to comply with this Order or with any part of this Order may subject DSC Ltd. to a civil penalty of $5,500 per day of noncompliance pursuant to Section 7003(b) of RCRA, 42 U.S.C. § 6973(b), and the May 9, 1997, Memorandum "Modifications to EPA Penalty Policies to Implement the Civil Monetary Penalty Inflation Rule (Pursuant to the Debt Collection Improvement Act of 1996)".

You may contact Mary McAuliffe at (312) 886-6237 to indicate your intent, or to discuss this Order.

Sincerely,

Joseph M. Boyle

Joseph M. Boyle, Chief
Enforcement and Compliance Assurance Branch

cc: Richard A. Barr
Dean & Fulkerson

Corporation Co.
Registered Agent for DSC Ltd.

JoAnn Merrick, MDEQ

Enclosure

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF DSC Ltd. 1491 West Jefferson Avenue Trenton, Michigan 48183 Respondent	ADMINISTRATIVE ORDER Docket No. R7003-5-99-003

I. JURISDICTION

The United States Environmental Protection Agency, Region 5 ("EPA"), issues this Administrative Order ("Order") pursuant to Section 7003(a) of the Solid Waste Disposal Act, as amended ("RCRA" or the "Act"), 42 U.S.C. § 6973(a) ("Section 7003").

II. INTRODUCTION

A. In 1996, Hamlin Holdings, Inc., purchased the assets of McLouth Steel Products Corporation ("McLouth"), including assets of McLouth's properties located in Gibralter, Michigan and Trenton, Michigan. Hamlin Holdings, Inc., assigned the assets of the Gibralter and Trenton properties to DSC Ltd. DSC Ltd., is a corporation registered to conduct business in Michigan. DSC Ltd. is the "Respondent" in this matter.

B. Respondent has handled "solid waste" within the meaning of Section 1004(27) of the Act, 42 U.S.C. § 6903(27), at a facility known as the Gibralter property located in Gibralter, Michigan (the "Gibralter Facility").

C. Based upon evidence received, EPA has determined that Respondent's handling of solid waste at the Gibralter Facility may present an imminent and substantial endangerment to health or the environment.

D. Pursuant to Section 7003(a) of the Act, EPA has notified the State of Michigan of this action.

E. EPA hereby takes this action pursuant to Section 7003 having determined that issuance of this Order is necessary to protect health or the environment.

III. PARTIES BOUND

A. This Order shall apply to and be binding upon Respondent and its officers, employees, agents, successors and assigns.

B. Respondent shall provide a copy of this Order to all contractors, subcontractors, laboratories, and consultants retained to conduct or monitor any portion of the work performed pursuant to this Order within seven (7) calendar days of the date of Respondent's receipt of this Order or date of such retention, and shall condition all such contracts on compliance with the terms of this Order.

C. Respondent shall give notice to EPA thirty (30) or more days prior to transfer of ownership or operation of the Facility.

IV. FINDINGS OF FACT

A. GENERAL FINDINGS OF FACT

1. Respondent is the owner and operator of the Gibralter Facility. The Gibralter Facility is located along West Jefferson Avenue in Gibralter, Michigan. See Exhibit 1.

2. Historically, the Gibralter Facility was a cold-rolling steel manufacturing plant. The Gibralter Facility's wastewater treatment system includes a series of basins and ponds, including an area commonly known as the "Tandem Mill Pond." The Tandem Mill Pond is an oil separation pond located south of the production building, approximately 6.2 acres in size. See Exhibit 2. Oily process water from the plant was pumped to the Tandem Mill Pond, where it was acidified to allow oil to separate from water. Water from the Tandem Mill Pond was then pumped to other National Pollution Discharge Elimination System, or NPDES-permitted wastewater treatment units for further processing prior to discharge through Outfall No. 01B into the Frank and Poet Drain. Separated oil was periodically removed by skimming, then disposed off-site. The process oils that accumulated in the Tandem Mill Pond were composed of lubricating, hydraulic, rolling, and slushing oils. They included both petroleum and animal derived materials. Non-aqueous materials in the Tandem Mill Pond generally are present in two forms--free floating oil and rag, a semi-solid, congealed emulsion of animal oils and fats, which sinks to the bottom of the Tandem Mill Pond during colder months, and rises to the surface during warmer months.

3. DSC Ltd. continues to use the Tandem Mill Pond. DSC Ltd. has identified the source of currently accumulating free oil as a plant sewer discharge pipe (oily water from plant basements) and residual oil which adheres to pond banks.

4. Respondent has placed or stored solid waste at the Tandem Mill Pond at the Gibralter Facility.

B. FINDINGS OF FACT REGARDING EFFECTS ON THE ENVIRONMENT

5. On April 8, 1999, an employee of the federal government observed and/or recovered the remains of fifteen (15) dead or dying migratory birds at the Tandem Mill Pond. All of the observed bird mortalities appear to be as the result of exposed oil waste at the Tandem Mill Pond.

6. On April 8, 1999, an employee of the federal government noted that at the Tandem Mill Pond, oil wastes had floated to the surface of the water and formed a layer of oily waste.

7. In May 1999, DSC Ltd. removed 38,500 gallons of oil and rag from the Tandem Mill Pond.

8. Oil will continue to accumulate on the surface of the Tandem Mill Pond as long as rag remains in the Tandem Mill Pond, and oily water is discharged to the Tandem Mill Pond.

V. CONCLUSIONS OF LAW

A. Respondent is a "person" within the meaning of Section 1004(15) of the Act, 42 U.S.C. § 6903(15).

B. Wastes at the Tandem Mill Pond located at the Gibralter Facility are solid wastes as defined in Section 1004(27) of the Act, 42 U.S.C. § 6903(27).

C. Respondent has contributed or is contributing to the handling, storage, treatment or disposal of solid waste at the Tandem Mill Pond.

D. Respondent's past or present handling, storage, treatment, transportation or disposal of solid waste at the Gibralter Facility may present an imminent and substantial endangerment to health or the environment within the meaning of Section 7003 of the Act, 42 U.S.C. § 6973.

VI. ORDER

Based on the above and on other information contained in the administrative record for this Order, EPA has determined that the activities required by this Order are necessary to protect health or the environment. EPA, therefore, hereby orders Respondent to perform as specified in this Order in the manner and by the dates specified herein. All work undertaken pursuant to this Order shall be performed in a manner consistent with this Order,

including all documents incorporated herein pursuant to this Order, and all applicable laws.

VII. WORK TO BE PERFORMED

A. IMMEDIATE EMERGENCY MEASURES

Within five (5) days of receiving this Order by facsimile or any other means, Respondent shall take immediate measures to stop the exposure of migratory birds to solid wastes at the Tandem Mill Pond. Such immediate measures may include, but are not limited to, physical barriers and audio or visual distractions designed to deter and discourage birds from landing at the Tandem Mill Pond.

B. CONTINUING EMERGENCY MEASURES

1. Within fifteen (15) calendar days of the effective date of this Order, Respondent shall submit to EPA for approval a Continuing Emergency Measures Workplan ("CEM Workplan") that proposes Continuing Emergency Measures necessary to protect wildlife or wildlife habitat from any harmful effects of solid waste at the Gibralter Facility, including the Tandem Mill Pond, and that describes the emergency measures that Respondent has implemented pursuant to Section VII.A., above.

   a. Continuing Emergency Measures shall include, but not be limited to, a method for permanently and continuously eliminating contact by wildlife with any solid waste, including any oily surfaces, at the Tandem Mill Pond.

   b. The CEM Workplan shall describe:

      (1) the selected Continuing Emergency Measures;

      (2) the procedures and a schedule for implementation; and

      (3) an operations and maintenance plan, which, if followed, will result in uninterrupted effectiveness of the chosen Continuing Emergency Measure(s).

2. EPA shall notify Respondent in writing of any comments EPA may have on the CEM Workplan and schedule. If EPA

determines that the CEM Workplan, including the schedule, is approvable, EPA will provide written approval of the CEM Workplan and schedule to Respondent. If EPA has comments on the CEM Workplan and/or schedule, EPA shall provide its comments in writing to Respondent. Within seven (7) days of receiving EPA's comments, Respondent shall incorporate those comments into the CEM Workplan and resubmit the CEM Workplan to EPA.

3. Concurrently with resubmitting to EPA the CEM Workplan incorporating EPA's comments, Respondent shall begin implementation of the Continuing Emergency Measures required in the CEM Workplan, and shall complete all Continuing Emergency Measures in accordance with the schedule approved in the CEM Workplan.

4. Within fifteen (15) calendar days of completing the Continuing Emergency Measures required in the CEM Workplan, Respondent shall provide a written report (Continuing Emergency Measures Implementation Report) to EPA for approval detailing and confirming the completion of the activities conducted pursuant to the CEM Workplan.

C. MONITORING AND REPORTING

During implementation of any actions taken pursuant to Section VII of this Order, Respondent shall submit a report by the fifteenth of every month describing all activities that have been taken pursuant to this Order during the prior month as well as all sampling and monitoring results.

VIII. ACCESS

A. Respondent shall permit full site access to EPA, Department of Interior ("DOI") and the State of Michigan, and their authorized representatives for the purposes of oversight of and implementation of this Order.

B. Respondent shall use its best efforts to assure that EPA, DOI and the State of Michigan personnel or authorized representatives are allowed access to any laboratory utilized by Respondent in implementing this Order.

IX. GENERAL PROVISIONS

A. Respondent shall submit a notice of intent to comply on or before the effective date of this Order.

B. All plans and documents submitted under any section of this Order shall, upon approval by EPA, be incorporated by reference into this Order as if set forth fully herein.

C. Within ten (10) days of the effective date of this Order, Respondent shall notify EPA, in writing, of the name, title, and qualifications of the personnel and contractors to be used in carrying out the work required by Section VII of this Order. Respondent shall demonstrate to EPA that each proposed contractor possesses all appropriate qualifications.

D. Respondent shall obtain any permits or approvals which are necessary to perform work on or outside the refinery under applicable law and shall submit timely applications and requests for any such permits and approvals.

E. Respondent shall employ sound scientific, engineering, and construction practices and principles under this Order.

X. AVAILABILITY AND RETENTION OF INFORMATION

A. The administrative record supporting this Order shall be available for public review at the United States Environmental Protection Agency, Region 5, 77 West Jackson Blvd., 7th Floor, Chicago, Illinois 60604 from 8:00am to 4:30pm, every federal business day.

B. Respondent shall make available to EPA, and shall retain, during the pendency of this Order and for a period of three (3) years after its termination, all records and documents in Respondent's possession, custody, or control, or in the possession, custody or control of their contractors and subcontractors, which relate to the performance of this Order, including but not limited to documents reflecting the results of any sampling, tests or other data or information generated or acquired by Respondent, or on Respondent's behalf, with respect to the implementation of this Order.

C. After the three (3) year period of document retention, Respondent shall notify EPA and the State at least ninety (90) calendar days prior to the destruction of any such documents, and upon request by EPA or the State of Michigan, shall deliver the documents to EPA or the State of Michigan.

D. Respondent may assert confidentiality claims pursuant to 40 C.F.R. Part 2.

E. Information determined to be confidential by EPA will be afforded the protection specified in 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is submitted to the EPA, the public may be given access to such information without further notice to Respondent.

XI. QUALITY ASSURANCE

A. Respondent shall use quality assurance, quality control, data validation, and chain of custody procedures for all data gathered under this Order in accordance with EPA SW-846, Third Edition, or subsequent edition as then in effect.

B. Respondent shall, upon EPA request, provide for analysis by EPA of samples submitted for quality assurance monitoring by the laboratory(ies) performing analyses required by this Order.

C. Respondent shall make available to EPA and the State of Michigan the results of all sampling and/or tests or other data generated by Respondent with respect to the implementation of this Order.

D. At the request of any party, the parties shall allow split or duplicate samples to be taken by the requestor or their authorized representatives, of any samples collected by any party to this Order. Respondent shall notify EPA no less than fourteen (14) days in advance of any sample collection activity conducted pursuant to Section VII.

XII. NOTICES

Whenever under the terms of this Order, notice is required to be given, and/or a report or other document is required to be forwarded by one party to another, such correspondence shall be sent by certified mail or hand carried to the following individuals at the addresses specified below:

As to the United States:

Ms. Diane Sharrow (DRE-9J)
RCRA Project Manager
Enforcement and Compliance Assurance Branch
U.S. EPA, Region 5
77 West Jackson Blvd.
Chicago, Illinois 60604

As to the State:

JoAnn Merrick, Chief
Enforcement Program Section
Waste Management Division
Department of Environmental Quality
State of Michigan
P.O. Box 30241
Lansing, MI 48909

If the date for submission of any item or notification required by this Order falls upon a weekend or State or Federal holiday, the time period for submission of that item or notification is extended to the next Federal working day following the weekend or holiday.

XIII. RESERVATION OF RIGHTS

A. Nothing in this Order shall limit the information gathering, access, and response authority of the United States under any other applicable law, nor shall it limit the authority of EPA to issue additional orders to Respondent as may be necessary.

B. This Order shall not be construed as a waiver of limitation of any rights, remedies, powers and/or authorities which EPA has under the Act, CERCLA or any other applicable law.

C. EPA hereby reserves all of its statutory and regulatory powers, authorities, rights, remedies, both legal and equitable, which may pertain to Respondent's failure to comply with any applicable laws and regulations and with any of the requirements of this Order, including but not limited to, the right to disapprove of work performed by Respondent, to request that Respondent perform additional tasks, and the right to perform any portion of the work herein.

D. Compliance by Respondent with the terms of this Order shall not relieve Respondent of its obligation to comply with the Act and/or any other applicable State or Federal law or regulation, and any condition of any permit issued under the Act or any other applicable law or regulation.

XIV. FAILURE TO COMPLY

Any failure by Respondent to comply with this Order shall subject Respondent to civil penalties of not more than $5,500.00 for each day of each failure to comply with this Order. Section 7003(b) of the Act, 42 U.S.C. § 6973(b), and the May 9, 1997,

Memorandum "Modifications to EPA Penalty Policies to Implement the Civil Monetary Penalty Inflation Rule (Pursuant to the Debt Collection Improvement Act of 1996)".

XV. OPPORTUNITY TO CONFER AND MODIFICATION

A. Respondent has the opportunity to confer informally with EPA concerning the terms and applicability of this Order. If Respondent desires a conference, Respondent must contact EPA Region 5 to schedule such a conference within three (3) calendar days of receipt of this Order.

B. If EPA determines that any element of this Order, including work to be performed or schedules, warrants modification after a conference is held, EPA will modify the Order in writing, file the modification with the Regional Hearing Clerk and issue a copy to Respondent.

C. Except as otherwise provided in this Order, no modification to this Order shall be effective unless and until it is issued in writing by EPA and filed with the Regional Hearing Clerk.

XVI. EFFECTIVE AND TERMINATION DATES

A. This Order shall become effective at 4:00pm (Central Standard Time) on the fifth (5) calendar day after the date Respondent receives a copy of the executed Order by facsimile or any other means.

B. This Order shall terminate upon Respondent's receipt of written notice from EPA that Respondent has demonstrated, to the satisfaction of EPA, that the requirements of this Order, including any additional tasks determined by EPA to be required pursuant to this Order, but not including record retention, have been satisfactorily completed.

IT IS SO ORDERED:

For the United States Environmental Protection Agency, Region 5

Date: June 21, 1999

By: Joseph M. Boyle

Joseph M. Boyle, Chief
Enforcement and Compliance
Assurance Branch

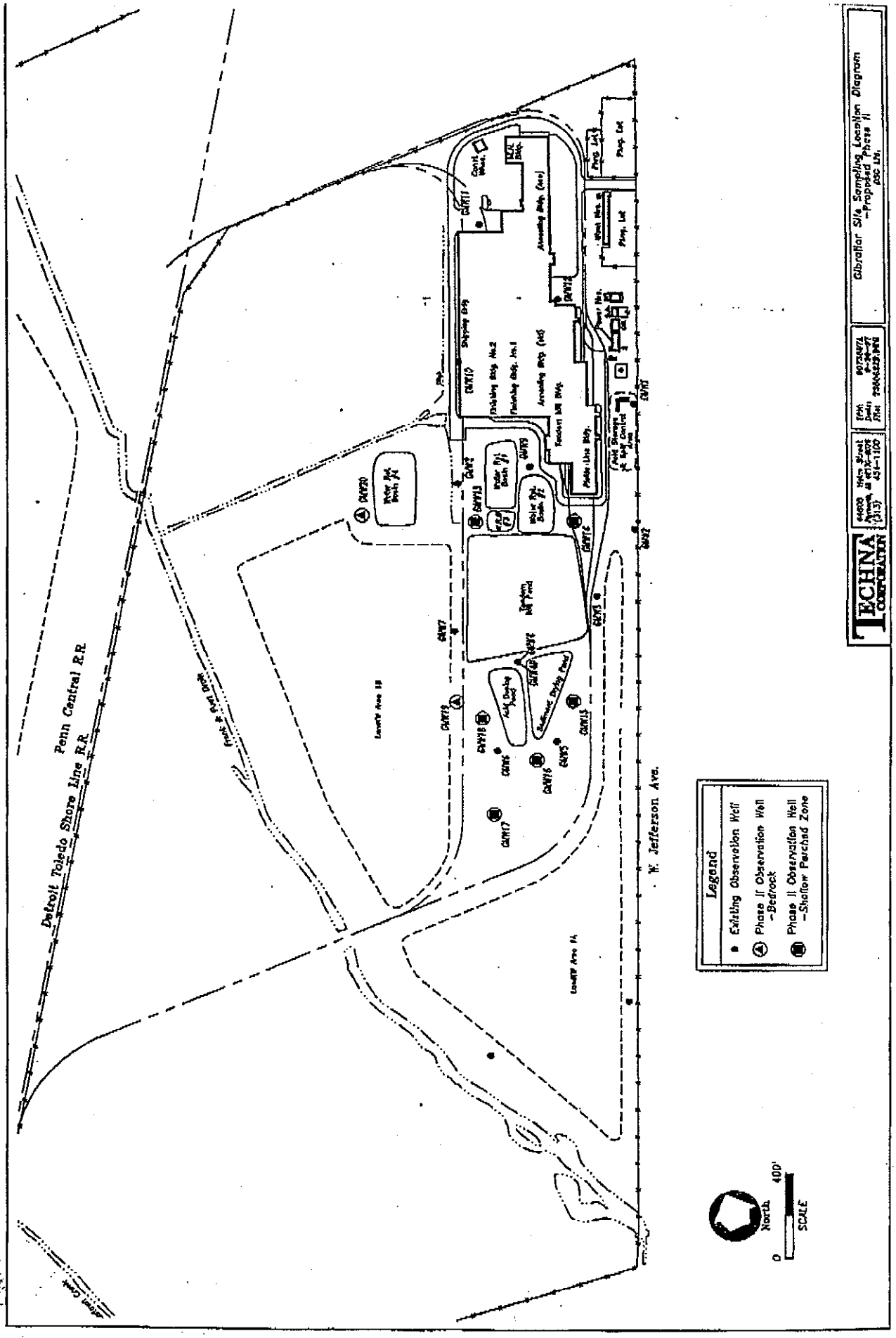
EXHIBITS

EXHIBIT 1: Map of Gibralter Facility

EXHIBIT 2: Map of Tandem Mill Pond

EXHIBIT 1

Map of Gibralter Facility

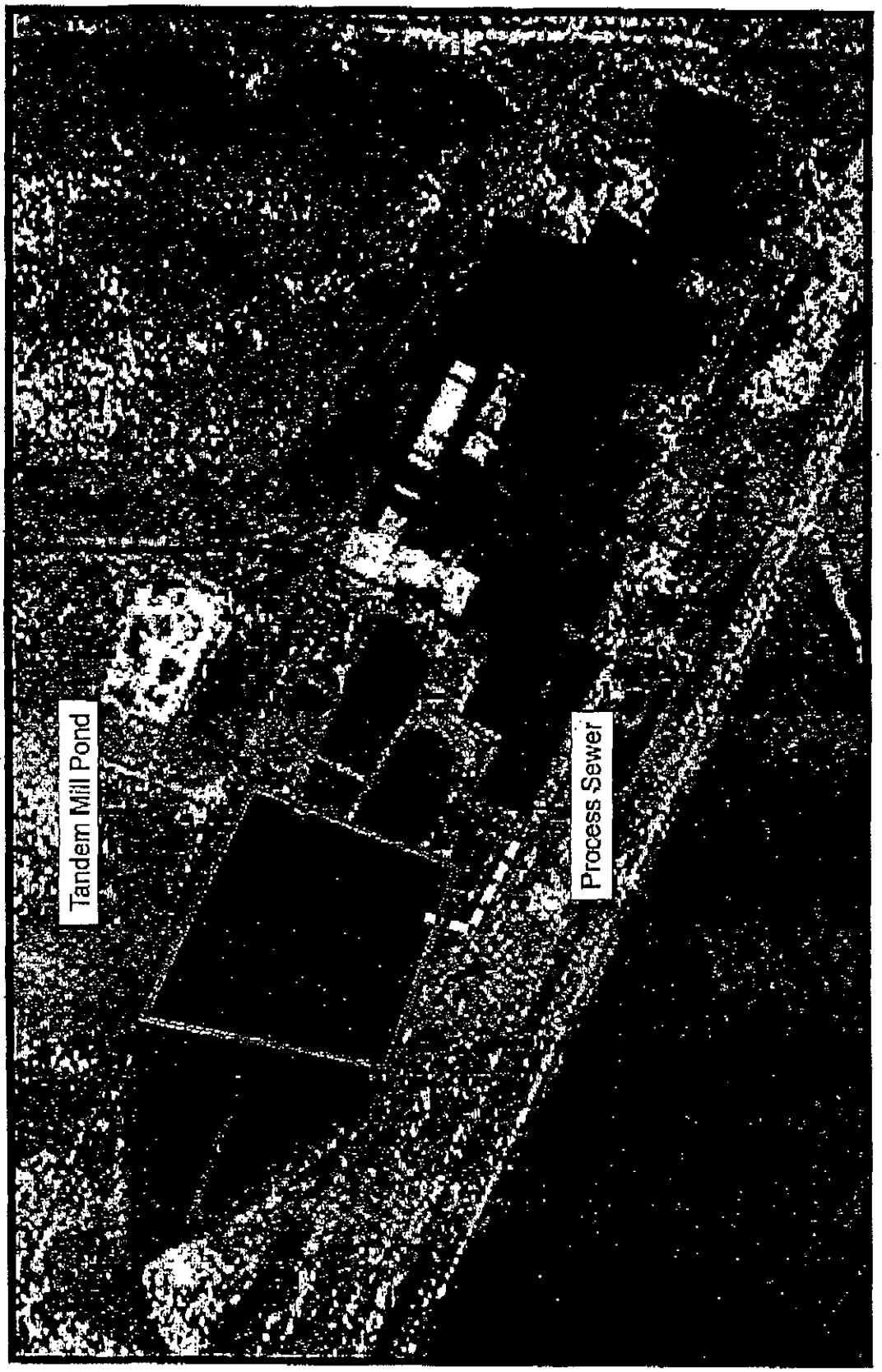


Gibraltar Site Sampling Location Diagram -Proposed Phase II

TECHNA CORPORATION

EXHIBIT 2

Tandem Mill Pond



In the Matter of DSC Ltd., Docket No. R7003-5-99-003

CERTIFICATE OF SERVICE

I certify that the foregoing Administrative Order, dated June 22, 1999, was sent in the following manner to the addressees listed below:

Copy by certified mail to:

Michael Wilkinson, President
DSC Ltd.
1491 W. Jefferson Avenue
Trenton, MI 48183

Corporation Co.
Registered Agent for DSC Ltd.
615 Griswold
Detroit, MI 48226

copy by facsimile and certified mail to:

Richard A. Barr
Dean & Fulkerson
Fifth Floor
801 West Big Beaver Road
Troy, Michigan 48084-4767
fax: (248) 362-8423

and a copy by U.S. Mail to:

JoAnn Merrick, Chief
Enforcement Program Section
Waste Management Division
Department of Environmental Quality
State of Michigan
P.O. Box 30241
Lansing, MI 48909

Richard Plettau
Secretary
United States Environmental
Protection Agency
77 West Jackson Blvd.
Chicago, IL 60604

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

DE-9J

D. 2.
Please see me!
Michael

NOV 24 1999

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Michael Wilkinson, President
DSC Limited
1491 West Jefferson Avenue
Trenton, Michigan 48183

Re: Continuing Emergency Measures
(CEM) Work Plan
ID No.:MID 005 320 254

Dear Mr. Wilkinson:

Under Section 7003 (a) of the Solid Waste Disposal Act, as amended, 42 U.S.C. § 6973 (a), on June 22, 1999, U.S. EPA, Region 5 issued an Administrative Order to DSC Limited. Among other things, this Order required DSC Limited to submit a Continuing Emergency Measures (CEM) Work Plan to Region 5. Region 5 has disapproved the two previous submittals of DSC Limited's CEM Work Plan. Region 5 has reviewed DSC Limited's Revision 3 of its CEM Work Plan, dated October 11, 1999, and finds the CEM Work Plan to be acceptable.

As requested by Dennis Zurakowski of your staff, enclosed with this letter of approval is a list of the bird remains found at the Tandem Mill Pond to date. The identification was made by the United States Fish and Wildlife Services's Office of Law Enforcement, National Fish and Wildlife Forensics Laboratory.

If you have any questions regarding the review and approval, or the list of bird remains, please contact Ms. Diane Sharrow, of my staff, at (312) 886-6199.

Sincerely,

Joseph M. Boyle

Joseph M. Boyle, Chief
Enforcement and Compliance Assurance Branch

Enclosure

cc: D. Zurakowski, DSC
R. Barr, Dean & Fulkerson
J. Merrick, MDEQ

ENCLOSURE

Sample No.	Bird Common Name: (April 1999 Inspection)
1	Great Blue Heron
2	Great Blue Heron
3	European Starling[1]
4	Unspecified Gull
5	Great Blue Heron
6	Unidentified[2]
7	Great Blue Heron
8	Unspecified Gull
9	Lesser Scaup
10	Lesser Scaup
11	Song Sparrow
12	Lesser Scaup
13	Song Sparrow
14	Kildeer
15	Bufflehead

Sample No.	Bird Common Name: (July 1999 Inspection)
16	Great Blue Heron
17	Great Blue Heron
18	Unidentified[3]
19	Great Blue Heron
20	Great Blue Heron
21	Unspecified Duck
22	Great Blue Heron
23	Great Blue Heron

Sample No.	Bird Common Name: (August 1999 Inspection)
24 through 30[4]	

[1] Three species of birds are not protected under the International Migratory Bird Treaty Act; the Rock Dove (aka pigeon), European Starling (aka Starling), House Sparrow (aka Sparrow).

[2] Unidentified, but not consistent with the three unprotected species listed in Footnote Number 1.

[3] See Footnote Number 1.

[4] No Morphological Examination To Date.

Appendix B – Boring Logs

Table 1

Groundwater Monitoring Wells
DSC, Ltd.
Gibraltar, Michigan

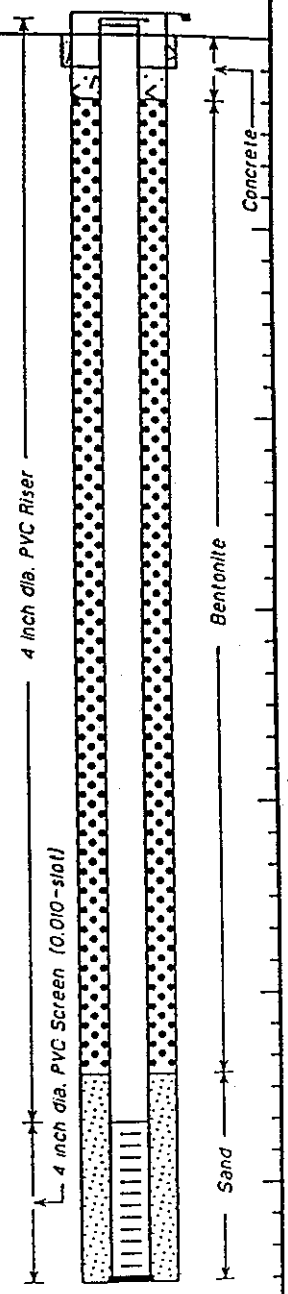
Number	Location Reference	Depth	Top of Casing Elevation	Ground Elevation	Comments
GMW1	Perimeter & Acid Storage	39 '	589.42	587.1	5' screen at clay/bedrock interface
GMW2	Perimeter	37 '	587.53	585.3	5' screen at clay/bedrock interface
GMW3	Tandem Mill Pond	43 '	592.54	590.2	5' screen at clay/bedrock interface
GMW4	Tandem Mill Pond	13 '	593.64	591.1	5' screen at fill/clay interface
GMW 4D	Tandem Mill Pond	40 '	593.48	591.2	5' screen at clay/bedrock interface
GMW5	South Ponds	39 '	594.7	591.6	5' screen at clay/bedrock interface
GMW 6	South Ponds	36 '	591.84	588.9	5' screen at clay/bedrock interface
GMW 7	Landfill 1B and Tandem Mill Pond	39 '	591.59	588.8	5' screen at clay/bedrock interface
GMW 8	Water Treatment Basins and Tandem Mill Pond	30 '	589.02	586.1	5' screen at clay/bedrock interface
GMW 9	Water Treatment Basins	36 '	587.62	588.1	5' screen at clay/bedrock interface
GMW10	NW Fill Area and Perimeter	33 '	590.71	588.0	5' screen at clay/bedrock interface
GMW11	NW Fill Area and Perimeter	29 '	588.23	586.4	5' screen at clay/bedrock interface
GMW12	Perimeter	29 '	586.51	586.9	5' screen at clay/bedrock interface

Top of casing and ground elevations based on NGVD datum. Survey completed August, 1997.

Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW1
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *587.1 NGVD*
DATE START/FINISH: *7/28/97*	INITIAL H20 LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H20 ELEV.: *574.97 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *39 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
	GMW1-A 0-2'	4 5 6 8	4			CL	CLAY: trace silt and fine sand, medium stiff, low to medium plasticity, moist, green gray.
						SP	SAND: fine to medium grain, loose, moist, rust.
						CL	CLAY: trace silt and fine sand, medium stiff, medium plasticity, brown.
	GMW1-B 4-6'	5 6 6 7	2				
6							
	GMW1-C 8-10'	7 12 14 14	<1				very stiff.
	GMW1-D 12-14'	7 13 20 28	<1				
12	16-18'	27 10 21 21	<1				hard.
18	18-20'	8 11 13 17	<1				trace silt, fine sand, and gravel, green gray with vertical rust color lamina.
24	24-26'	5 7 10 12	<1				trace silt and fine sand, gray.
	28-30'	5 8 11 15	<1				
30	32-34'	2 2 2 2	<1				soft, very moist.
36	36-38'	1 1 1 1	<1				very soft, saturated.
							Clay/Bedrock (limestone) interface
							END OF BORING
42							

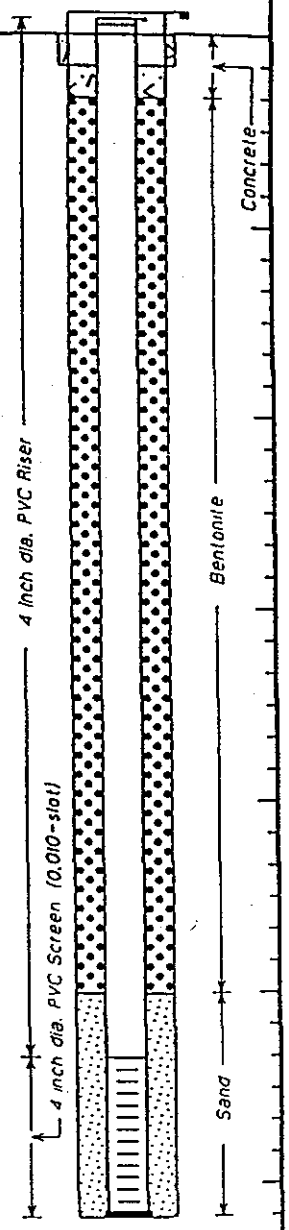
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW2
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *585.3 NGVD*
DATE START/FINISH: *7/28/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *574.93 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *37 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	0-2'		<1			SC	CLAYEY SAND: some clay, trace fine sand and silt, loose, moist, brown.
						CL	CLAY: trace silt and fine sand, hard, medium plasticity, saturated, gray.
	4-6'		<1				
6							
	8-10'		<1				moist, brown.
12	12-14'		<1				
	16-18'		<1				green gray.
18							
	20-22'		<1				gray.
24	24-26'		<1				stiff.
	28-30'		<1				medium stiff.
30							
	32-34'		<1				soft, very moist.
							saturated.
36							Bedrock interface
							END OF BORING
42							

WELL DIAGRAM



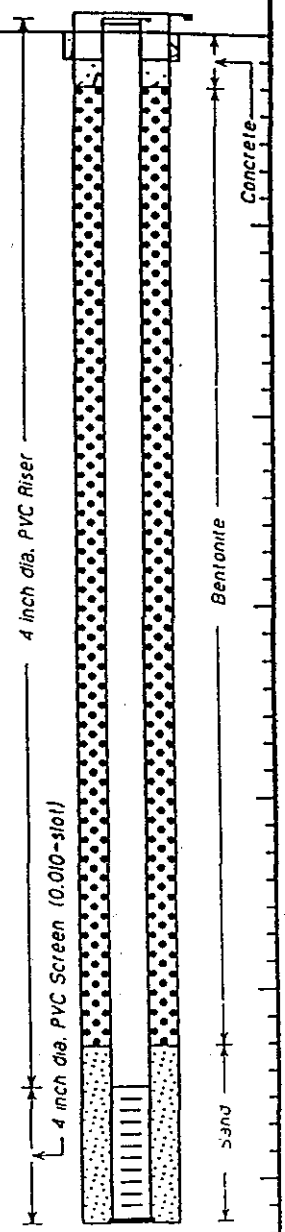
Techna Corporation
Plymouth, Michigan

Log of Monitoring Well GMW3

PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *590.2 NGVD*
DATE START/FINISH: *8/4/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *574.96 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *43.5 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0–50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
	GMW3-A 0-0.5'	20				SC	FILL: sand: fine to medium textured, some clay, medium dense, damp, brown.
	GMW3-B 4-6'	8 3 3 4				CL	clay: trace sand and silt, stiff, medium plasticity, moist, gray.
7	GMW3-C 8-10'	3 3 4 4				CL	CLAY: trace sand and silt, medium stiff, medium plasticity, moist, light brown.
	GMW3-D 12-14'	4 5 5 8					trace gravel, stiff.
14	16-18'	2 3 3 3					rust colored thin vertical lamina.
	20-22'	8 10 12 15					very stiff, brown.
21							trace sand and silt, damp, gray.
28							
35							
42							very moist.
							saturated.
							LIMESTONE BEDROCK
49							END OF BORING

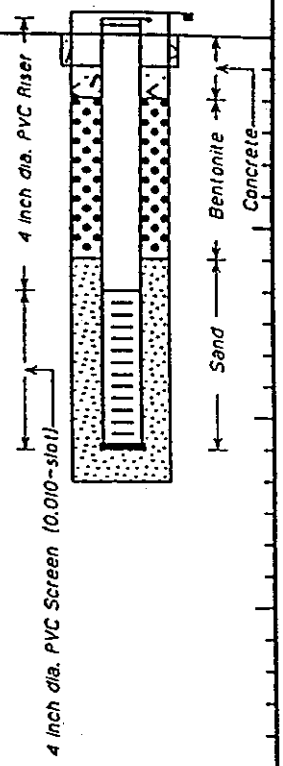
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW4
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *591.1 NGVD*
DATE START/FINISH: *7/29/97 & 7/30/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *588.24 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *14 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW4A 0-2'	4 5 7 7	<1			SC	FILL: clayey sand: fine, some clay, trace silt, medium dense, damp, dark brown.
6	GMW4B 4-6'	10 18 20 22	<1				dense.
	GMW4C 8-10'	2 4 4 5	<1				loose, wet, black staining.
12	GMW4D 12-14'	3 4 4 4	<1			CL	CLAY: trace sand and silt, medium stiff, medium plasticity, moist, green gray.
							END OF BORING
18							
24							
30							
36							
42							

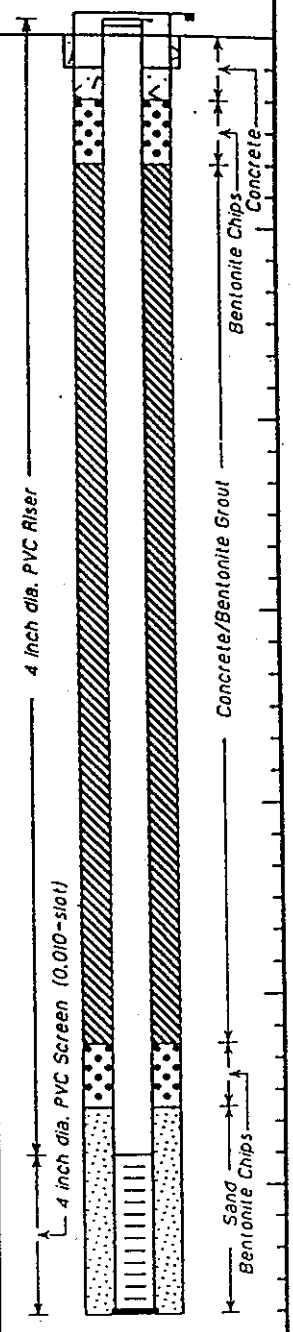
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW4D
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *591.2 NGVD*
DATE START/FINISH: *8/7/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *575.31 NGVD*
SAMPLING METHOD:	TOTAL DEPTH: *40 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(074)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0						SC	FILL: clayey sand: fine, some clay, trace silt, medium dense, damp, dark brown.
6							dense.
							loose, wet, black staining.
12						CL	CLAY: trace sand and silt, medium stiff, medium plasticity, moist, green gray.
18							
24							
30							
36							
42							END OF BORING (Refusal on bedrock)

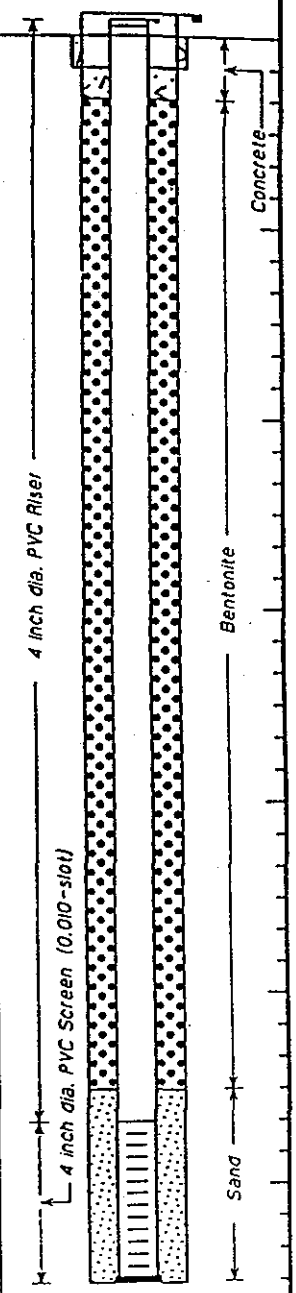
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW5
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *591.6 NGVD*
DATE START/FINISH: *7/29/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *575.48 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *39 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
	GMW5-A 0-2'	2 3 6 13	<1			CL	FILL: sandy lean clay, some fine sand, trace silt, medium stiff to very stiff, low to medium plasticity, moist, brown.
	GMW5-B 4-6'	6 6 7 7	<1				stiff, pieces of plastic sheeting.
6	GMW5-C 8-10'	2 2 3 4	<1				medium stiff, very moist, dark brown.
12	GMW5-D 12-14'	3 4 2 1	<1				soft, medium plasticity, saturated, black. plasticity.
	16-18'	6 13 13 29	<1			CL	CLAY: trace silt and fine sand, very stiff to hard, medium plasticity, moist, brown.
18	20-22'	6 16 17 32	<1				trace gravel, very stiff to hard.
24	24-26'	37 57 62 42					
	28-30'	3 6 6 7	<1				stiff.
30	32-34'	4 4 4 3	<1				medium stiff
36	36-38'	3 5 6 6	<1				trace gravel, stiff, saturated.
							Bedrock (limestone)
42							END OF BORING

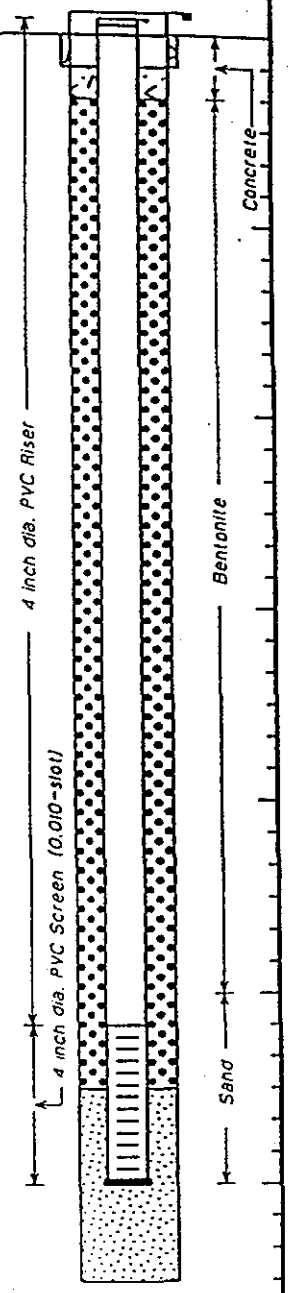
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW6
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *588.9 NGVD*
DATE START/FINISH: *7/28/97*	INITIAL H2O LEVEL: *34 Feet*
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *575.42 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *38 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0–50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW6-A 0-2'	5 3 7 9	5			CL	FILL: sandy lean clay, some fine to medium sand, little fine gravel, trace silt, medium stiff to very stiff, low to medium plasticity, moist, brown.
	GMW6-B 4-6'	5 6 7 15	<1				
6	8-10'	4 6 8 12					sample recovery in shoe only: clay: trace silt and fine sand, medium stiff, very moist, dark brown.
12	GMW6-C 12-14'	5 9 10 14	<1				very stiff, moist, rust brown.
	16-18'	8 10 16 14	<1			CL	CLAY: little silt, trace sand and gravel, very stiff, medium plasticity, damp, brown.
18							boulder at 18.5 feet.
	20-21'	20 21	<1				trace silt and fine sand, damp, rust colored thin vertical lamina.
24	24-26'	5 6 7 7	<1				trace gravel, stiff, moist, gray.
	28-30'	11 5 7 11	3				trace fine to medium sand and silt, very stiff, gray.
30	32-34'	17 10 5 9	<1				very moist. saturated.
							Fractured limestone
36							Solid Bedrock (limestone) END OF BORING
42							

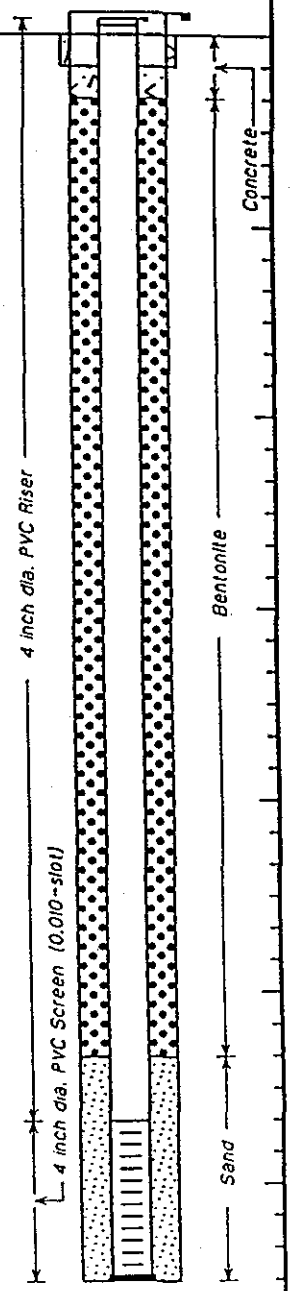
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW7
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *588.8 NGVD*
DATE START/FINISH: *7/31/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *575.4 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *39 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0						SC	FILL: clayey sand: fine to medium sand, some clay, trace silt, loose, damp, brown.
	GMW7-A 4-6'	4 6 7 3	<1				some fine gravel, saturated, dark brown.
6							
	GMW7-B 8-10'	3 3 7 7	<1			CL	CLAY: trace silt and fine sand, medium stiff to stiff, medium plasticity, moist, light brown.
12	GMW7-C 12-14'	8 14 18 23	<1				very stiff to hard, damp.
	GMW7-D 16-18'	11 13 18 23	5				gray, rust colored vertical thin lamina.
18							
	20-22'	10 12 14 15	4				very stiff.
24	24-26'	3 5 8 11	<1				moist, gray.
	28-30'	2 4 4 7	<1				medium stiff to stiff, saturated.
30							
	32-34'	1 1 2 2	<1				soft.
36	36-38'	4 5 5 6	<1				stiff.
							Bedrock (limestone)
							END OF BORING
42							

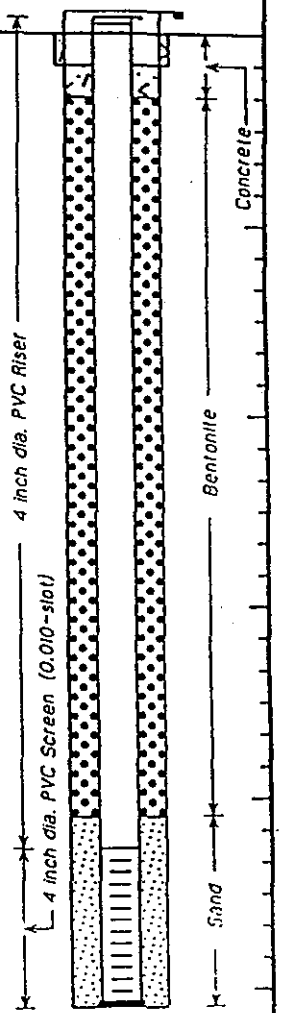
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW8
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *586.1 NGVD*
DATE START/FINISH: *8/1/97*	INITIAL H20 LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H20 ELEV.: *574.97 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *30.5 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE (0 – 50)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW8-A 0-2'	18 31 25 14	<1			SP	FILL: sand: fine to medium textured, trace fine gravel and silt, dense, damp, brown.
	GMW8-B 4-6'	4 5 6 7	<1				loose.
6						CL	CLAY: trace sand and silt, stiff, medium plasticity, moist, brown.
	GMW8-C 8-10'	8 8 12 13	20				very stiff, damp.
12	GMW8-D 12-14'	4 14 21 31	7				trace gravel, hard.
	18-18'	10 14 24 30	<1				
18							
	20-22'	34 20 50 45	<1				
24							
	28-30'	12 10 5 5	<1				some gravel, medium stiff, saturated.
30							LIMESTONE BEDROCK END OF BORING
36							
42							

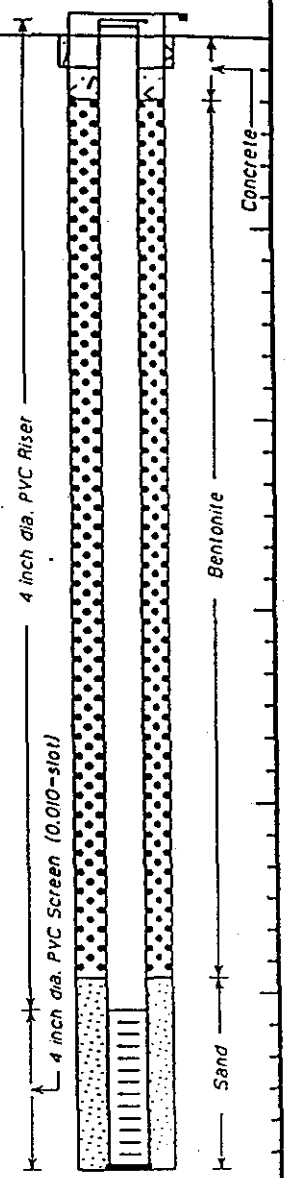
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW9
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *588.1 NGVD*
DATE START/FINISH: *8/4/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *574.94 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *35.5 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW9-A 0-2'	12 14 18 23				SP	2" Gravel surface FILL: sand: fine to medium texture, trace gravel, medium dense to dense, moist, brown.
	GMW9-B 4-6'	3 3 3 3				CL	CLAY: trace sand and silt, medium stiff, medium plasticity, moist, green gray.
6							very moist.
	GMW9-C 8-10'	1 1 1 1					
	GMW9-D 12-14'	8 2 2 2					
12	14-16'	1 2 3 6				SM CL	SAND: fine texture, some silt, loose, saturated, dark brown, staining. CLAY: trace sand and silt, soft to medium stiff, medium plasticity, moist, gray.
18							medium stiff.
24							
30							
							some gravel, soft, saturated, brown.
36							LIMESTONE BEDROCK END OF BORING
42							

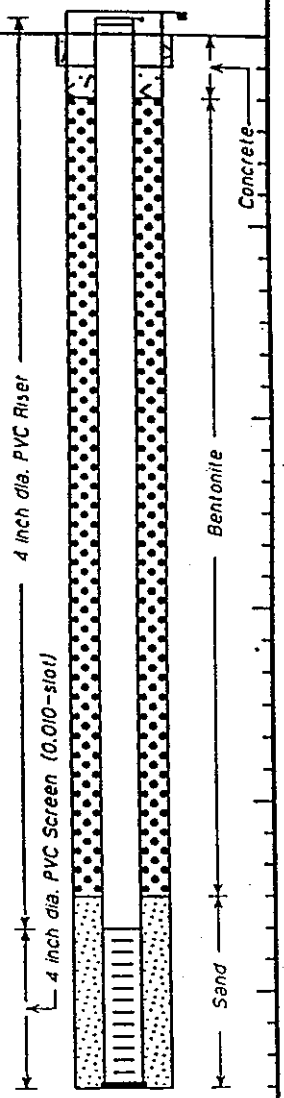
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW10
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *588.0 NGVD*
DATE START/FINISH: *7/31/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *570.36 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *32 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW10-A 0-0.5'	NA	<1			PT	FILL: Peat: little fine sand, trace clay, moist, dark brown.
						SP	
						CL	SAND: fine to medium textured, some fine gravel, trace clay and silt, loose, moist, dark brown.
						ML	CLAY: trace fine sand and silt, medium stiff, low to medium plasticity, moist, brown.
6						CL	SILT: some fine sand, trace clay, soft, moist, brown.
							CLAY: trace fine sand and silt, stiff, medium plasticity, moist, brown.
							very stiff.
12						SM	SILTY SAND: fine to medium textured, some silt, trace clay, loose, saturated, black.
							CLAY: trace fine sand, silt, and fine gravel, hard, medium plasticity, dry, brown.
18							
24							damp.
30							very stiff, saturated.
							LIMESTONE: fractured.
							Solid Bedrock (limestone)
36							END OF BORING
42							

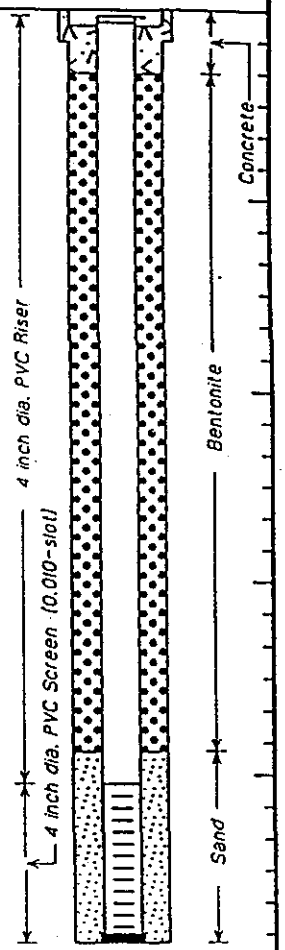
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW11
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *586.4 NGVD*
DATE START/FINISH: *8/1/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *569.63 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *29.25 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW11-A .5-2.5'	17 24 7 10	<1			SP	4" Asphalt FILL: sand: fine to medium textured, some fine gravel, medium dense, damp, light brown.
6							
	9-11'	5 13 20 22	<1			ML	SILT: little fine sand, medium hard, very moist, light brown. saturated.
12							
	13-15'		<1			CL	CLAY: trace fine sand and silt, stiff, medium plasticity, moist, brown.
18	18-20'	8 12 17 22	<1				trace gravel, damp. hard, dry.
	22-24'		<1				
24							very moist. saturated.
							LIMESTONE: fractured.
	29-29.25'	50+					LIMESTONE: unfractured. END OF BORING
30							
36							
42							

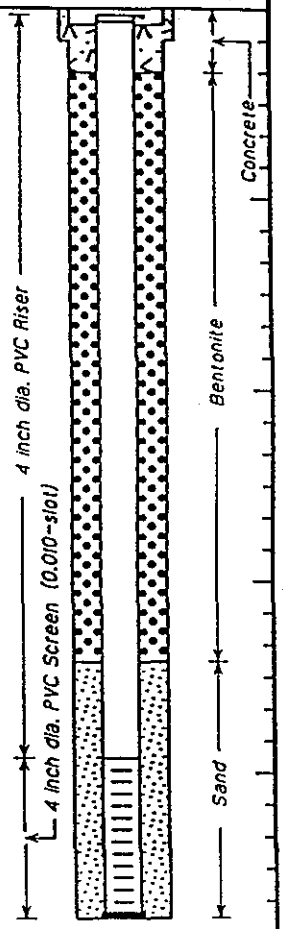
WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Monitoring Well GMW12
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McLouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION: *586.9 NGVD*
DATE START/FINISH: *8/4/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.: *574.51 NGVD*
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *28.5 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE (0 – 50)	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION
0	GMW12-A 0.5-2.5'	4 3 4 4	4			SP	4" Asphalt FILL: Sand: fine to medium textured, trace clay and silt, loose, moist, light brown.
	GMW12-B 4-6'	1 1 1 1	<1				very loose, very moist.
6	GMW12-C 8-10'	1 3 8 10	2				loose to medium dense, damp.
12	GMW12-D 12-14'	2 2 3 9	<1			CL	CLAY: trace sand and silt, medium stiff to stiff, medium plasticity, moist, gray.
	16-18'	3 5 6 8	<1				stiff.
18	20-22'	6 10 12 7					very stiff, trace gravel.
24							saturated.
							LIMESTONE BEDROCK END OF BORING
30							
36							
42							

WELL DIAGRAM



Techna Corporation Plymouth, Michigan	Log of Boring GSB1
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McClouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION:
DATE START/FINISH: *7/29/97 & 7/30/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.:
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *18 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	REMARKS
0	0-2'	7 7 2 5	<1			SC	FILL: clayey sand: fine, some clay, trace silt, loose, damp, dark brown.	
	4-6'	5 7 23 17					medium dense to dense.	
6	8-10'	6 8 10 12	<1			CL	CLAY: trace silt and fine to medium sand, very stiff, medium plasticity, damp, light brown.	
12	12-14'	8 11 19 19	<1				very stiff to hard.	
	16-18'	18 17 20 24					hard.	
18							END OF BORING	
24								
30								
36								
42								

Techna Corporation Plymouth, Michigan	Log of Boring GSBIT
PROJECT: *OSC LTD./Gibraltar*	LOCATION: *Former McClouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION:
DATE START/FINISH: *7/31/97*	INITIAL H20 LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H20 ELEV.:
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *14 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 5	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	REMARKS
	GS81T-A 0-2'	9 8 13 13	<1			SP SC	FILL: sand: fine, some fine gravel, little clay, medium dense, damp, dark brown, hydrocarbon-like staining on ground surface.	
	GS81T-B 4-6'	12 18 22 30	<1				trace gravel, dense, moist.	
6								
	GS81T-C 8-10'	3 4 5 6	<1				CLAY: trace fine sand and silt, medium stiff to stiff, medium plasticity, moist, light brown.	
12	GS81T-D 12-14'	9 11 18 22	<1				trace gravel, very stiff to hard, damp.	
							END OF BORING	
18								
24								
30								
36								
42								

Techna Corporation Plymouth, Michigan	Log of Boring GSB2
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McClouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION:
DATE START/FINISH: *7/31/97*	INITIAL H20 LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H20 ELEV.:
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *17 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	REMARKS
	GSB2-A 0-2'	7 11 9 10	<1			SC	FILL: sand: fine, some clay, trace silt, medium dense, damp, dark brown, surficial staining.	
	4-6'	2 3 3 3					CLAY: some fine sand, trace silt, soft, low to medium plasticity, moist, brown, insufficient recovery for sample.	
6	GSB2-C 8-10'	2 3 3 3	<1			CL	CLAY: little fine to medium sand, trace silt and fine gravel, medium stiff, medium plasticity, moist, brown.	
12	GSB2-D 12-14'	12 14 17 23	<1				very stiff to hard, damp.	
	GSB2-E 15-17'	11 12 16 24	<1				very stiff to hard.	
18							END OF BORING	
24								
30								
36								
42								

Techna Corporation Plymouth, Michigan	Log of Boring GSB3
PROJECT: *DSC LTD./Gibraltar*	LOCATION: *Former McClouth Steel Plant, Gibraltar, MI*
PROJECT NO.: *00738-09A-001*	SURFACE ELEVATION:
DATE START/FINISH: *8/4/97*	INITIAL H2O LEVEL:
DRILLING METHOD: *4.25-inch ID Hollow Stem Auger*	STATIC H2O ELEV.:
SAMPLING METHOD: *2 foot by 2-inch Split Barrel Sampler*	TOTAL DEPTH: *15 Feet*
DRILLING COMPANY: *Carlo Environmental Technologies*	LOGGED BY: *(124)*

DEPTH feet	LAB SAMPLE NO.	BLOWS/0.5 ft.	PID (relative ppm) VALUES	PID (relative ppm) PROFILE 0 50	GRAPHIC LOG	SOIL CLASS	GEOLOGIC DESCRIPTION	REMARKS
	GSB3-A 0-2'	6 3 5 12				SC	2" Gravel surface. FILL: sand: fine to medium texture, some clay, trace gravel, loose to medium dense, moist, dark brown, hydrocarbon-like staining and odor on surface.	
6	GSB3-B 4-6'	7 5 6 5					CLAY: trace fine sand, silt, and fine gravel, stiff, medium, plasticity, moist, brown.	
	GSB3-C 8-10'	1 1 1 2					soft.	
12	GSB3-D 13-15'						very moist.	
							END OF BORING	
18								
24								
30								
36								
42								

Appendix C – Tandem Mill Pond Sediment Assessment and Groundwater Sampling Results

TABLE 4
SUMMARY OF SEDIMENT COMPOSITE ANALYTICAL DATA - SEMI-VOLATILE ORGANIC COMPOUNDS
DSC LTD.
GIBRALTAR, MICHIGAN

FIELDID	UNIT	TPC1
SAMPDATE		4/26/2001
SMPL_ALIAS		TPC1
Depth		NA
Acenaphthene	ug/kg	<990.0
Acenaphthylene	ug/kg	<990.0
Anthracene	ug/kg	**8,700.0**
Benzo[a]anthracene	ug/kg	<990.0
Benzo(k)+Benzo(b)fluoranthene	ug/kg	<990.0
Benzo[g,h,i]perylene	ug/kg	<990.0
Benzo[a]pyrene	ug/kg	<990.0
2-Choronaphthalene	ug/kg	<990.0
Chrysene	ug/kg	<990.0
Dibenz[a,h]anthracene	ug/kg	<990.0
Fluoranthene	ug/kg	**8,600.0**
Fluorene	ug/kg	**75,000.0**
Indeno[1,2,3-cd]pyrene	ug/kg	<990.0
Naphthalene	ug/kg	**5,400.0**
Phenanthrene	ug/kg	**100,000.0**
Pyrene	ug/kg	**18,000.0**
Benzidine	ug/kg	<4,900.0
4-Bromophenylphenyl ether	ug/kg	<990.0
bis(2-chloroethyl)ether	ug/kg	<2,500.0
bis(2-chloroethoxy)methane	ug/kg	<2,500.0
bis(2-chloroisopropyl)ether	ug/kg	<2,500.0
4-Chlorophenylphenyl ether	ug/kg	<990.0
1,2-Dichlorobenzene	ug/kg	<2,600.0
1,3-Dichlorobenzene	ug/kg	<3,000.0
1,4-Dichlorobenzene	ug/kg	<2,600.0
3,3'-Dichlorobenzidine	ug/kg	<4,900.0
Dimethyl phthalate	ug/kg	<990.0
2,4-Dinitrotoluene	ug/kg	<990.0
2,6-Dinitrotoluene	ug/kg	<990.0
1,2-Diphenylhydrazine	ug/kg	<4,900.0
Hexachlorobenzene	ug/kg	<990.0
Hexachlorobutadiene	ug/kg	<990.0
Hexachlorocyclopentadiene	ug/kg	<2,500.0
Hexachloroethane	ug/kg	<2,500.0
Isophorone	ug/kg	<990.0
Nitrobenzene	ug/kg	<990.0
n-Nitrosodimethylamine	ug/kg	<4,900.0
n-Nitroso-di-n-propylamine	ug/kg	<4,900.0
n-Nitrosodiphenylamine	ug/kg	<4,900.0
1,2,4-Trichlorobenzene	ug/kg	<990.0
2-Chlorophenol	ug/kg	<2,000.0
2,4-Dichlorophenol	ug/kg	<990.0
2,4-Dimethylphenol	ug/kg	**6,100.0**
2,4-Dinitrophenol	ug/kg	<4,900.0

TABLE 4
SUMMARY OF SEDIMENT COMPOSITE ANALYTICAL DATA - SEMI-VOLATILE ORGANIC COMPOUNDS
DSC LTD.
GIBRALTAR, MICHIGAN

FIELDID	UNIT	TPC1
SAMPDATE		4/26/2001
SMPL_ALIAS		TPC1
Depth		NA
4,6-Dinitro-o-cresol	ug/kg	<4,900.0
4-Chloro-3-methylphenol	ug/kg	<2,000.0
2-Nitrophenol	ug/kg	<2,500.0
4-Nitrophenol	ug/kg	<2,500.0
Pentachlorophenol	ug/kg	<3,500.0
Phenol	ug/kg	4,100.0
2,4,6-Trichlorophenol	ug/kg	<2,000.0
Di-n-octyl phthalate	ug/kg	<990.0
bis(2-Ethylhexyl)phthalate	ug/kg	<1,100.0
Butyl benzyl phthalate	ug/kg	<990.0
Di-n-butyl phthalate	ug/kg	<990.0
Diethyl phthalate	ug/kg	<990.0

cc: J. Black

TECHNA CORPORATION
Knowledge, and the Creativity to Use It
44808 Helm St. Plymouth, MI 48170 (313) 454-1100 Fax. 454-1233

SUMMARY REPORT
DSC GIBRALTAR POND ASSESSMENT

1.0 INTRODUCTION

Initial assessment and characterization activities were conducted in December 1997 at the Acid Dosing and Tandem Mill Ponds, located at the DSC Ltd. Gibraltar Plant. The objectives of these activities were to collect preliminary data about the pond depths and sediment characteristics to support development of closure strategies.

2.0 ASSESSMENT AND CHARACTERIZATION ACTIVITIES

2.1 Sample Collection and Depth Measurement

Sample collection and depth measurement activities were performed by Terra Probe Environmetal Inc. Two sediment core samples (Figure 1) were collected from the bottom of the Acid Dosing Pond (ADP) on December 9, 1997 using Geoprobe Hand Sampling Equipment. The sampling platform was a raft designed for this task. One sample was taken from the center of the north half of the pond and the other was taken from the center of the south half of the pond. Each sample was homogenized in a stainless steel bowl, then an aliquot was removed for chemical analysis. The depths to sediment, sediment thickness, and depth to the underlying native clay were measured at ten locations (Figure 1).

The Tandem Mill Pond (TMP) was similarly assessed on December 12, 1997 using the same sampling platform (raft). The depth to sediment, sediment thickness, and depth to native clay were measured at fourteen locations (Figure 2). Results of these measurements indicated that the only sediment on the pond bottom was a 2-3 inch layer of rag oil. This layer is believed to float on the pond surface during warm weather and sink during cold weather. Samples of this oily material were collected from four separate locations in TMP (Figure 2). Grab samples were collected with a steel can with extension handle. The samples from the north and east locations were composited to form one sample for analysis, and the samples from the west and south locations were similarly composited.

2.2 Chemical Analyses

Chemical analyses were performed by Fire and Environmental Consulting Laboratories, Inc. Samples from the TMP were analyzed for the presence and concentration of volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), Michigan ten metals, PCBs, and oil and grease. Samples from the ADP were analyzed for Michigan ten metal and phenolic species. The two ADP samples also were subjected to the Toxicity Characteristic Leaching Procedure (TCLP). The TCLP leachate was analyzed for Michigan ten metals and phenolic species.

All samples were collected and preserved prior to analysis according to accepted MDEQ and USEPA protocols. Analyses were performed using methodologies specified in the USEPA SW-846 compendium of waste characterization procedures.

3.0 RESULTS

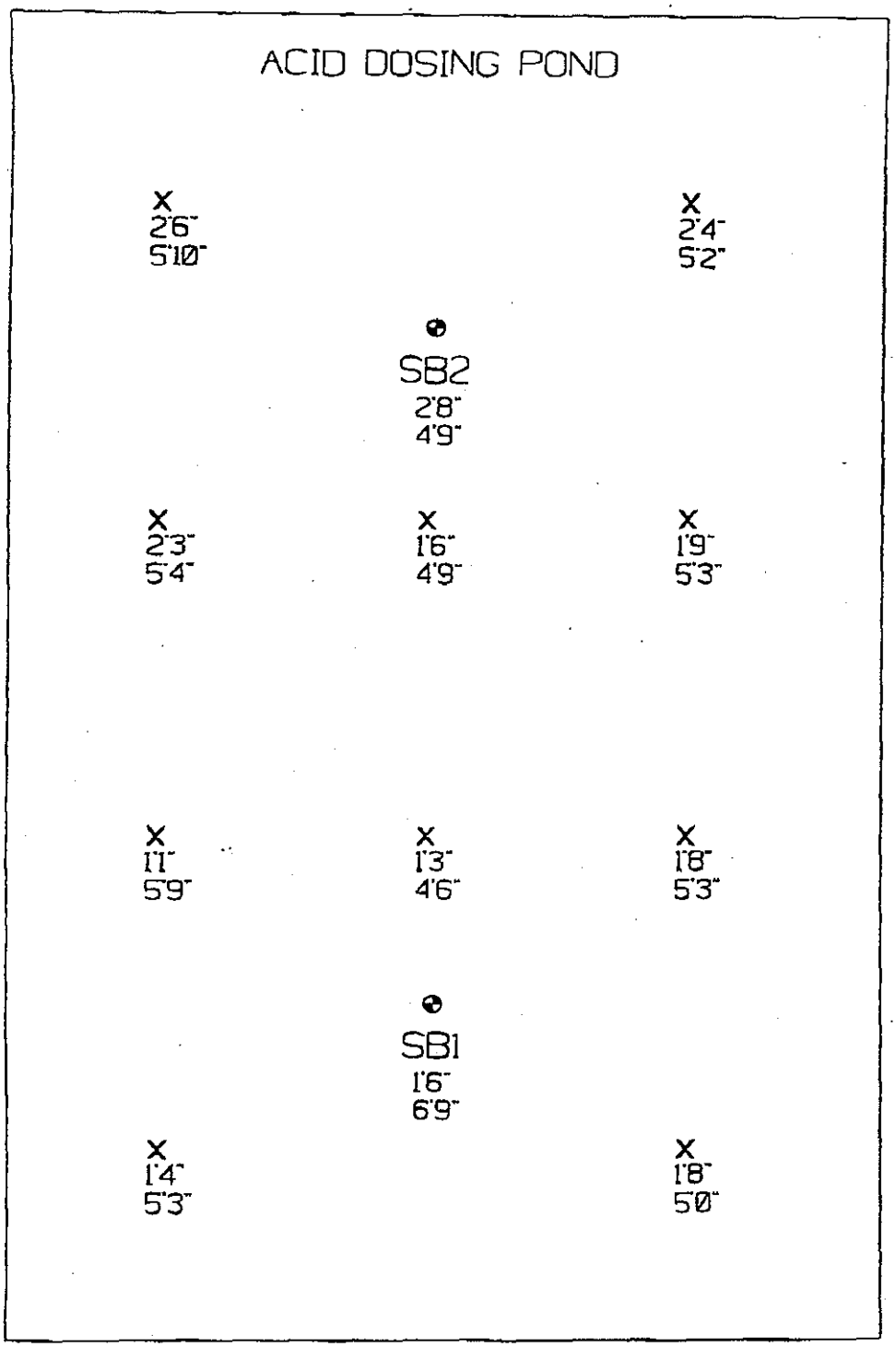
3.1 Pond Structures

The depth of the underlying clay bottom of the ADP was found to be approximately 5-6 feet below the water surface on the date of assessment. Approximately 3-4 feet of sediment lies on the bottom of the pond.

The depth of the clay bottom in the TMP varied from approximately six feet to approximately 13 feet. Reports from samplers indicated that bottom was uneven in several locations. Variances in bottom depth of several feet occasionally were detected over short lateral distances (3-6 feet). This may indicate historical dredging of the pond. No sediment accumulations were detected in the TMP. A layer of oily rag material, approximately 2-3' in thickness, was the only non-clay material detected on the bottom.

3.2 Results of Chemical Analyses

The results of chemical analyses of pond sediment samples are presented in Table 1 and Table 2. Results are presented only for analytes detected in at least one sample; analytes not listed in the tables were not detected.



LEGEND

⊕ — SAMPLE LOCATION
X — DEPTH MEASUREMENT
18" — SEDIMENT DEPTH FROM WATER SURFACE
50" — CLAY DEPTH FROM WATER SURFACE

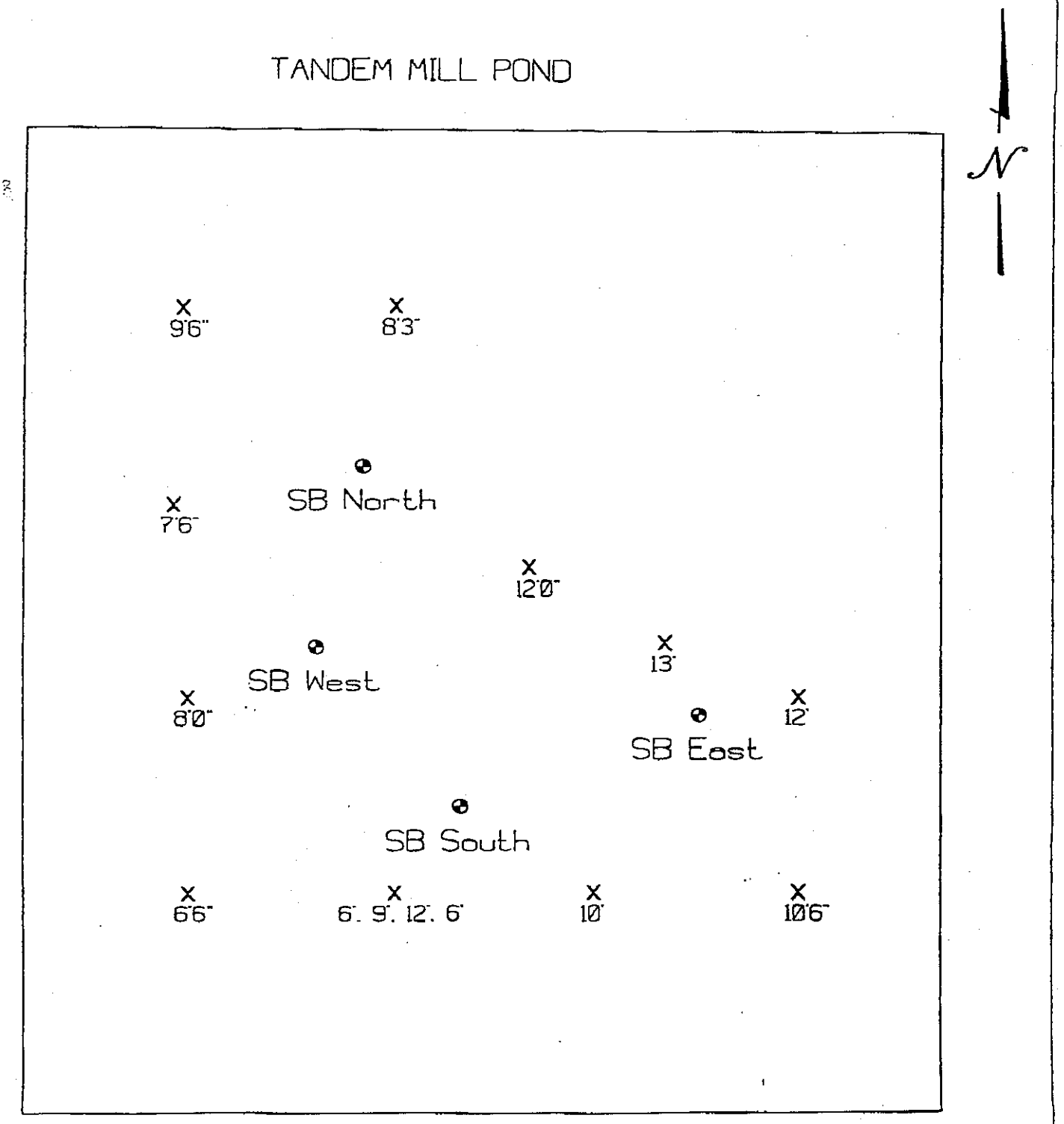
Terra Probe
Environmental Inc.
(734) 854-7703

DSC Ltd.
GIBRALTOR, MICHIGAN

ACID DOSING POND
SLUDGE AND CLAY DEPTH

DRAWN BY: SWO
PROJECT #: 1754

FIGURE 1



LEGEND

X — DEPTH MEASUREMENT

9Ø" — CLAY DEPTH FROM WATER SURFACE

— SEDIMENT SAMPLING LOCATION

Terra Probe
Environmental Inc.
(734) 854-7703

DSC Ltd.
GIBRALTOR, MICHIGAN

TANDEM MILL POND
CLAY DEPTH

DRAWN BY: SMO
PROJECT #: 0254

FIGURE 2

TABLE 1

Sample Identification	Concentrations (mg/kg) Reported Above Minimum Reporting Limit/Minimum Quantitation Level													
	Total Metals										SVOCs		VOCs	Precent
	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver	Zinc	Phenol	2,4-Dimethylphenol	Toluene	Oil and Grease
Acid Dosing North	12.60	82.80	<0.05	117.00	89.70	98.60	<0.01	<0.50	0.39	676.00	41.00	not analyzed	<0.05	not analyzed
Acid Dosing South	10.00	55.90	1.03	100.00	72.40	104.00	<0.01	<0.50	0.53	692.00	26.00	not analyzed	0.05	not analyzed
Tandem Mill SW	52.40	128.00	1.18	52.30	951.00	94.90	<0.01	<0.50	0.49	1,640.00	100.00	<100.00	<0.05	75%
Tandem Mill NE	58.10	153.00	1.02	54.60	919.00	99.70	<0.01	<0.50	0.43	1,680.00	158.00	105.00	<0.05	70%

TABLE 2

Sample Identification	TCLP Concentrations (mg/l) Reported Above Minimum Reporting Limit/Minimum Quantitation Level											
	Leachate Metals										Leachate SVOCs	
	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver	Zinc	Phenol	2,4-Dimethylphenol
Acid Dosing North	<0.001	0.34	<0.0002	0.02	0.12	<0.003	<0.0002	<0.005	<0.0005	0.67	0.64	0.87
Acid Dosing South	<0.001	0.30	<0.0002	0.02	0.08	<0.003	<0.0002	<0.005	0.02	0.53	0.33	0.65
Tandem Mill SW&NE	<0.005	0.71	<0.001	0.03	0.18	<0.003	<0.0002	<0.005	<0.001	0.77	not analyzed	not analyzed

FECL

Revised Report
Analytical Laboratory Report
Techna Corporation
February 05, 1998

FECL #: AA55158 (Continued)
Tag: Tandem Mill Pond SW Composite
Date/Time Collected: 12/12/97 10:30
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Semi-Volatile Organic (Continued)						
Hexachlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
Hexachlorobutadiene	Not detected	mg/kg	100	8270	JB	12/19/97
Hexachlorocyclopentadiene	Not detected	mg/kg	100	8270	JB	12/19/97
Hexachloroethane	Not detected	mg/kg	100	8270	JB	12/19/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	100	8270	JB	12/19/97
Isophorone	Not detected	mg/kg	100	8270	JB	12/19/97
3-Methylcholanthrene	Not detected	mg/kg	100	8270	JB	12/19/97
Methyl methanesulfonate	Not detected	mg/kg	100	8270	JB	12/19/97
2-Methylnaphthalene	Not detected	mg/kg	100	8270	JB	12/19/97
Naphthalene	Not detected	mg/kg	100	8270	JB	12/19/97
1-Naphthylamine	Not detected	mg/kg	100	8270	JB	12/19/97
2-Naphthylamine	Not detected	mg/kg	100	8270	JB	12/19/97
2-Nitoraniline	Not detected	mg/kg	100	8270	JB	12/19/97
3-Nitroaniline	Not detected	mg/kg	100	8270	JB	12/19/97
4-Nitroaniline	Not detected	mg/kg	100	8270	JB	12/19/97
Nitrobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
2-Nitrophenol	Not detected	mg/kg	100	8270	JB	12/19/97
4-Nitrophenol	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitroso-di-n-butylamine	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosodimethylamine	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosodiphenylamine	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosopiperidine	Not detected	mg/kg	100	8270	JB	12/19/97
Pentachlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
Pentachloronitrobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
Pentachlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
Phenacetin	Not detected	mg/kg	100	8270	JB	12/19/97
Phenanthrene	Not detected	mg/kg	100	8270	JB	12/19/97
Phenol	100	mg/kg	100	8270	JB	12/19/97
2-Picoline	Not detected	mg/kg	100	8270	JB	12/19/97
Pronamide	Not detected	mg/kg	100	8270	JB	12/19/97
Pyrene	Not detected	mg/kg	100	8270	JB	12/19/97
1,2,4,5-Tetrachlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
2,3,4,6-Tetrachlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
2,4,5-Trichlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97

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Revised Report
Analytical Laboratory Report
Techna Corporation
February 05, 1998

FECL #: AA55158 (Continued)
Tag: Tandem Mill Pond SW Composite
Date/Time Collected: 12/12/97 10:30
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Semi-Volatile Organic (Continued)						
2,4,6-Trichlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosodi-n-propylamine	Not detected	mg/kg	100	8270	JB	12/19/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromochloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromodichloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromoform	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromomethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
n-Butylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
sec-Butylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
tert-Butylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Carbon tetrachloride	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chloroform	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
2-Chlorotoluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
4-Chlorotoluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Dibromochloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dibromoethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Dibromomethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,3-Dichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,4-Dichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Dichlorodifluoromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1-Dichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1-Dichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
cis-1,2-Dichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
trans-1,2-Dichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,3-Dichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97

* Increased detection limit due to matrix interference (oily sludge).

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Revised Report
Analytical Laboratory Report
Techna Corporation
February 05, 1998

FECL #: AA55158 (Continued)
Tag: Tandem Mill Pond SW Composite
Date/Time Collected: 12/12/97 10:30
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
2,2-Dichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1-Dichloropropene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Ethylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Hexachlorobutadiene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Isopropylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
p-Isopropyltoluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Methylene chloride	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Naphthalene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
n-Propylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Styrene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Tetrachloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Toluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,1-Trichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,2-Trichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Trichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Trichlorofluoromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,3-Trichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,4-Trimethylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,3,5-Trimethylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Vinyl chloride	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
o-Xylene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
p,m-Xylene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
cis-1,3-Dichloropropene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
PCB List						
PCB-1016	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1242	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1221	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1232	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1248	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1254	Not detected	mg/kg	10	8081	JB	12/21/97

* Increased detection limit due to matrix interference (oily sludge).

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Revised Report
Analytical Laboratory Report
Techna Corporation
February 05, 1998

FECL #: AA55158 (Continued)
Tag: Tandem Mill Pond SW Composite
Date/Time Collected: 12/12/97 10:30
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
PCB List (Continued)						
PCB-1260	Not detected	mg/kg	10	8081	JB	12/21/97

FECL #: AA55159
Tag: Tandem Mill Pond NE Composite
Date/Time Collected: 12/12/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics						
BNA Extraction	Completed			625/8270	GK	12/16/97
Extraction, PCB	Completed				JKB	12/16/97
GC/MS for Semi-Volatile Organic						
Acenaphthene	Not detected	mg/kg	100	8270	JB	12/19/97
Acenaphthylene	Not detected	mg/kg	100	8270	JB	12/19/97
Acetophenone	Not detected	mg/kg	100	8270	JB	12/19/97
Aniline	Not detected	mg/kg	100	8270	JB	12/19/97
Anthracene	Not detected	mg/kg	100	8270	JB	12/19/97
4-Aminobiphenyl	Not detected	mg/kg	100	8270	JB	12/19/97
Benzidine	Not detected	mg/kg	100	8270	JB	12/19/97
Benzoic acid	Not detected	mg/kg	100	8270	JB	12/19/97
Benzo(a)anthracene	Not detected	mg/kg	100	8270	JB	12/19/97
Benzo(b)fluoranthene	Not detected	mg/kg	100	8270	JB	12/19/97
Benzo(k)fluoranthene	Not detected	mg/kg	100	8270	JB	12/19/97
Benzo(ghi)perylene	Not detected	mg/kg	100	8270	JB	12/19/97
Benzo(a)pyrene	Not detected	mg/kg	100	8270	JB	12/19/97
Benzyl alcohol	Not detected	mg/kg	100	8270	JB	12/19/97
Bis(2-chloroethoxy)methane	Not detected	mg/kg	100	8270	JB	12/19/97
Bis(2-chloroethyl)ether	Not detected	mg/kg	100	8270	JB	12/19/97
Bis(2-chlorisopropyl)ether	Not detected	mg/kg	100	8270	JB	12/19/97
Bis(2-ethylhexyl)phthalate	Not detected	mg/kg	100	8270	JB	12/19/97
4-Bromophenyl phenyl ether	Not detected	mg/kg	100	8270	JB	12/19/97
Butyl benzyl phthalate	Not detected	mg/kg	100	8270	JB	12/19/97

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FECL #: AA55159 (Continued)
Tag: Tandem Mill Pond NE Composite
Date/Time Collected: 12/12/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Semi-Volatile Organic (Continued)						
4-Chloroaniline	Not detected	mg/kg	100	8270	JB	12/19/97
1-Chloronaphthalene	Not detected	mg/kg	100	8270	JB	12/19/97
2-Chloronaphthalene	Not detected	mg/kg	100	8270	JB	12/19/97
4-Chloro-3-methylphenol	Not detected	mg/kg	100	8270	JB	12/19/97
2-Chlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
4-Chlorophenyl phenyl ether	Not detected	mg/kg	100	8270	JB	12/19/97
Chrysene	Not detected	mg/kg	100	8270	JB	12/19/97
p,m-Cresol	Not detected	mg/kg	100	8270	JB	12/19/97
o-Cresol	Not detected	mg/kg	100	8270	JB	12/19/97
Dibenz(a,j)acridine	Not detected	mg/kg	100	8270	JB	12/19/97
Dibenzo(ah)anthracene	Not detected	mg/kg	100	8270	JB	12/19/97
Dibenzofuran	Not detected	mg/kg	100	8270	JB	12/19/97
Di-n-butyl phthalate	Not detected	mg/kg	100	8270	JB	12/19/97
1,2-Dichlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
1,3-Dichlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
1,4-Dichlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
3,3'-Dichlorobenzidine	Not detected	mg/kg	100	8270	JB	12/19/97
2,4-Dichlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
2,6-Dichlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
Diethyl phthalate	Not detected	mg/kg	100	8270	JB	12/19/97
p-Dimethylaminoazobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
7,12-Dimethylbenz(a)anthacene	Not detected	mg/kg	100	8270	JB	12/19/97
a-,a-Dimethylphenethylamine	Not detected	mg/kg	100	8270	JB	12/19/97
2,4-Dimethylphenol	105	mg/kg	100	8270	JB	12/19/97
Dimethyl phthalate	Not detected	mg/kg	100	8270	JB	12/19/97
4,6-Dinitro-2-methylphenol	Not detected	mg/kg	100	8270	JB	12/19/97
2,4-Dinitrophenol	Not detected	mg/kg	100	8270	JB	12/19/97
2,4-Dinitrotoluene	Not detected	mg/kg	100	8270	JB	12/19/97
2,6-Dinitrotoluene	Not detected	mg/kg	100	8270	JB	12/19/97
Diphenylamine	Not detected	mg/kg	100	8270	JB	12/19/97
1,2-Diphenylhydrazine	Not detected	mg/kg	100	8270	JB	12/19/97
Di-n-octyl phthalate	Not detected	mg/kg	100	8270	JB	12/19/97
Ethyl methanesulfonate	Not detected	mg/kg	100	8270	JB	12/19/97
Fluoranthene	Not detected	mg/kg	100	8270	JB	12/19/97
Fluorene	Not detected	mg/kg	100	8270	JB	12/19/97

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FECL #: AA55159 (Continued)
Tag: Tandem Mill Pond NE Composite
Date/Time Collected: 12/12/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Semi-Volatile Organic (Continued)						
Hexachlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
Hexachlorobutadiene	Not detected	mg/kg	100	8270	JB	12/19/97
Hexachlorocyclopentadiene	Not detected	mg/kg	100	8270	JB	12/19/97
Hexachloroethane	Not detected	mg/kg	100	8270	JB	12/19/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/kg	100	8270	JB	12/19/97
Isophorone	Not detected	mg/kg	100	8270	JB	12/19/97
3-Methylcholanthrene	Not detected	mg/kg	100	8270	JB	12/19/97
Methyl methanesulfonate	Not detected	mg/kg	100	8270	JB	12/19/97
2-Methylnaphthalene	Not detected	mg/kg	100	8270	JB	12/19/97
Naphthalene	Not detected	mg/kg	100	8270	JB	12/19/97
1-Naphthylamine	Not detected	mg/kg	100	8270	JB	12/19/97
2-Naphthylamine	Not detected	mg/kg	100	8270	JB	12/19/97
2-Nitoraniline	Not detected	mg/kg	100	8270	JB	12/19/97
3-Nitroaniline	Not detected	mg/kg	100	8270	JB	12/19/97
4-Nitroaniline	Not detected	mg/kg	100	8270	JB	12/19/97
Nitrobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
2-Nitrophenol	Not detected	mg/kg	100	8270	JB	12/19/97
4-Nitrophenol	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitroso-di-n-butylamine	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosodimethylamine	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosodiphenylamine	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosopiperidine	Not detected	mg/kg	100	8270	JB	12/19/97
Pentachlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
Pentachloronitrobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
Pentachlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
Phenacetin	Not detected	mg/kg	100	8270	JB	12/19/97
Phenanthrene	Not detected	mg/kg	100	8270	JB	12/19/97
Phenol	158	mg/kg	100	8270	JB	12/19/97
2-Picoline	Not detected	mg/kg	100	8270	JB	12/19/97
Pronamide	Not detected	mg/kg	100	8270	JB	12/19/97
Pyrene	Not detected	mg/kg	100	8270	JB	12/19/97
1,2,4,5-Tetrachlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
2,3,4,6-Tetrachlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	100	8270	JB	12/19/97
2,4,5-Trichlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97

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FECL #: AA55159 (Continued)
Tag: Tandem Mill Pond NE Composite
Date/Time Collected: 12/12/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Semi-Volatile Organic (Continued)						
2,4,6-Trichlorophenol	Not detected	mg/kg	100	8270	JB	12/19/97
N-Nitrosodi-n-propylamine	Not detected	mg/kg	100	8270	JB	12/19/97
GC/MS for Volatile Organics						
Benzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromochloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromodichloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromoform	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Bromomethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
n-Butylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
sec-Butylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
tert-Butylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Carbon tetrachloride	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chloroform	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Chloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
2-Chlorotoluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
4-Chlorotoluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Dibromochloromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dibromo-3-chloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dibromoethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Dibromomethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,3-Dichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,4-Dichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Dichlorodifluoromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1-Dichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1-Dichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
cis-1,2-Dichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
trans-1,2-Dichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2-Dichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,3-Dichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97

* Increased detection limit due to matrix interference (oily sludge).

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FECL #: AA55159 (Continued)
Tag: Tandem Mill Pond NE Composite
Date/Time Collected: 12/12/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS for Volatile Organics (Continued)						
2,2-Dichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1-Dichloropropene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Ethylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Hexachlorobutadiene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Isopropylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
p-Isopropyltoluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Methylene chloride	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Naphthalene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
n-Propylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Styrene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,1,2-Tetrachloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,2,2-Tetrachloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Tetrachloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Toluene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,3-Trichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,4-Trichlorobenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,1-Trichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,1,2-Trichloroethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Trichloroethene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Trichlorofluoromethane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,3-Trichloropropane	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,2,4-Trimethylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
1,3,5-Trimethylbenzene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
Vinyl chloride	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
o-Xylene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
p,m-Xylene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
cis-1,3-Dichloropropene	Not detected	mg/kg	* 0.05	8260	VFM	12/18/97
PCB List						
PCB-1016	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1242	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1221	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1232	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1248	Not detected	mg/kg	10	8081	JB	12/21/97
PCB-1254	Not detected	mg/kg	10	8081	JB	12/21/97

* Increased detection limit due to matrix interference (oily sludge).

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FECL #: AA55159 (Continued)
Tag: Tandem Mill Pond NE Composite
Date/Time Collected: 12/12/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
PCB List (Continued)						
PCB-1260	Not detected	mg/kg	10	8081	JB	12/21/97

FECL #: AA55160
Tag: Acid Dosing Pond South
Date/Time Collected: 12/09/97 10:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	28.8	%	1	160.3	I M	12/18/97
Metals						
Arsenic	10.5	mg/kg	0.50	6020	E B	12/22/97
Barium	55.9	mg/kg	1.0	6020	E B	12/22/97
Cadmium	1.03	mg/kg	0.05	6020	E B	12/22/97
Chromium	100	mg/kg	1.0	6020	E B	12/22/97
Copper	72.4	mg/kg	1.0	6020	E B	12/22/97
Lead	104	mg/kg	1.0	6020	E B	12/22/97
Mercury	Not detected	mg/kg	0.10	7471	E B	12/23/97
Selenium	Not detected	mg/kg	0.50	6020	E B	12/22/97
Silver	0.53	mg/kg	0.20	6020	E B	12/22/97
Zinc	692	mg/kg	1.0	6020	E B	12/22/97
Arsenic	Not detected	mg/L	0.001	200.8	E B	12/22/97
Barium	0.30	mg/L	0.01	200.8	E B	12/22/97
Cadmium	Not detected	mg/L	0.0002	200.8	E B	12/22/97
Chromium	0.02	mg/L	0.01	200.8	E B	12/22/97
Copper	0.08	mg/L	0.01	200.8	E B	12/22/97
Lead	Not detected	mg/L	0.003	200.8	E B	12/22/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	12/23/97
Selenium	Not detected	mg/L	0.005	200.8	E B	12/22/97
Silver	0.0154	mg/L	0.0005	200.8	E B	12/22/97
Zinc	0.53	mg/L	0.01	200.8	E B	12/22/97

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FECL #: AA55160 (Continued)
Tag: Acid Dosing Pond South
Date/Time Collected: 12/09/97 10:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals (Continued)						
TCLP Extraction						
% Solids	58			1311	I M	12/17/97
Sample used g	100			1311	I M	12/17/97
Final Volume ml	1,202			1311	I M	12/17/97
Final Extract pH	6.16			1311	I M	12/17/97
Organics						
BNA Extraction	Completed			625/8270	GK	12/16/97
Phenols						
4-Chloro-3-methylphenol	Not detected	mg/L	0.02	625	JB	12/20/97
2-Chlorophenol	Not detected	mg/L	0.02	625	JB	12/20/97
2,4-Dichlorophenol	Not detected	mg/L	0.02	625	JB	12/20/97
2,4-Dimethylphenol	0.65	mg/L	0.02	625	JB	12/20/97
2,4-Dinitrophenol	Not detected	mg/L	0.04	625	JB	12/20/97
2-Methyl-4,6-dinitrophenol	Not detected	mg/L	0.04	625	JB	12/20/97
2-Nitrophenol	Not detected	mg/L	0.02	625	JB	12/20/97
4-Nitrophenol	Not detected	mg/L	0.04	625	JB	12/20/97
Pentachlorophenol	Not detected	mg/L	0.02	625	JB	12/20/97
Phenol	0.33	mg/L	0.02	625	JB	12/20/97
2,4,6-Trichlorophenol	Not detected	mg/L	0.02	625	JB	12/20/97

FECL #: AA55161
Tag: Acid Dosing Pond North
Date/Time Collected: 12/09/97 11:00
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Total Solids	23.2	%	1	160.3	I M	12/18/97
Metals						
Arsenic	12.6	mg/kg	0.50	6020	E D	12/22/97
Barium	82.8	mg/kg	1.0	6020	E B	12/22/97

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FECL #: AA55161 (Continued)
Tag: Acid Dosing Pond North
Date/Time Collected: 12/09/97 11:00
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals (Continued)						
Cadmium	Not detected	mg/kg	0.05	6020	E B	12/22/97
Chromium	117	mg/kg	1.0	6020	E B	12/22/97
Copper	89.7	mg/kg	1.0	6020	E B	12/22/97
Lead	98.6	mg/kg	1.0	6020	E B	12/22/97
Mercury	Not detected	mg/kg	0.10	7471	E B	12/23/97
Selenium	Not detected	mg/kg	0.50	6020	E B	12/22/97
Silver	0.39	mg/kg	0.20	6020	E B	12/22/97
Zinc	676	mg/kg	1.0	6020	E B	12/22/97
Arsenic	Not detected	mg/L	0.001	200.8	E B	12/22/97
Barium	0.34	mg/L	0.01	200.8	E B	12/22/97
Cadmium	Not detected	mg/L	0.0002	200.8	E B	12/22/97
Chromium	0.02	mg/L	0.01	200.8	E B	12/22/97
Copper	0.12	mg/L	0.01	200.8	E B	12/22/97
Lead	Not detected	mg/L	0.003	200.8	E B	12/22/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	12/23/97
Selenium	Not detected	mg/L	0.005	200.8	E B	12/22/97
Silver	Not detected	mg/L	0.0005	200.8	E B	12/22/97
Zinc	0.67	mg/L	0.01	200.8	E B	12/22/97
TCLP Extraction						
% Solids	45			1311	I M	12/17/97
Sample used g	100			1311	I M	12/17/97
Final Volume ml	945			1311	I M	12/17/97
Final Extract pH	6.01			1311	I M	12/17/97
Organics						
BNA Extraction	Completed			625/8270	GK	12/16/97
Phenols						
4-Chloro-3-methylphenol	Not detected	mg/L	0.02	625	JB	12/23/97
2-Chlorophenol	Not detected	mg/L	0.02	625	JB	12/23/97
2,4-Dichlorophenol	Not detected	mg/L	0.02	625	JB	12/23/97
2,4-Dimethylphenol	0.87	mg/L	0.02	625	JB	12/23/97
2,4-Dinitrophenol	Not detected	mg/L	0.04	625	JB	12/23/97
2-Methyl-4,6-dinitrophenol	Not detected	mg/L	0.04	625	JB	12/23/97
2-Nitrophenol	Not detected	mg/L	0.02	625	JB	12/23/97

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FECL #: AA55161 (Continued)
Tag: Acid Dosing Pond North
Date/Time Collected: 12/09/97 11:00
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Phenols (Continued)						
4-Nitrophenol	Not detected	mg/L	0.04	625	JB	12/23/97
Pentachlorophenol	Not detected	mg/L	0.02	625	JB	12/23/97
Phenol	0.64	mg/L	0.02	625	JB	12/23/97
2,4,6-Trichlorophenol	Not detected	mg/L	0.02	625	JB	12/23/97

FECL #: AA55162
Tag: Tandem Mill Pond South West
Date/Time Collected: 12/09/97 11:00
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals						
Arsenic	52.4	mg/kg	0.50	6020	E B	12/22/97
Barium	128	mg/kg	1.0	6020	E B	12/22/97
Cadmium	1.18	mg/kg	0.05	6020	E B	12/22/97
Chromium	52.3	mg/kg	1.0	6020	E B	12/22/97
Copper	951	mg/kg	1.0	6020	E B	12/22/97
Lead	94.9	mg/kg	1.0	6020	E B	12/22/97
Mercury	Not detected	mg/kg	0.10	7471	E B	12/23/97
Selenium	Not detected	mg/kg	0.50	6020	E B	12/22/97
Silver	0.49	mg/kg	0.20	6020	E B	12/22/97
Zinc	1,640	mg/kg	1.0	6020	E B	12/22/97

FECL

Revised Report
Analytical Laboratory Report
Techna Corporation
February 05, 1998

FECL #: AA55163
Tag: Tandem Mill Pond North East
Date/Time Collected: 12/09/97 11:15
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals						
Arsenic	58.1	mg/kg	0.50	6020	E B	12/22/97
Barium	153	mg/kg	1.0	6020	E B	12/22/97
Cadmium	1.02	mg/kg	0.05	6020	E B	12/22/97
Chromium	54.6	mg/kg	1.0	6020	E B	12/22/97
Copper	919	mg/kg	1.0	6020	E B	12/22/97
Lead	99.7	mg/kg	1.0	6020	E B	12/22/97
Mercury	Not detected	mg/kg	0.10	7471	E B	12/23/97
Selenium	Not detected	mg/kg	0.50	6020	E B	12/22/97
Silver	0.43	mg/kg	0.20	6020	E B	12/22/97
Zinc	1,680	mg/kg	1.0	6020	E B	12/22/97

Note: Methods may be modified for improved performance.
Results reported on a dry weight basis, where applicable.
Results relate only to items tested.
Report shall not be reproduced except in full, without the written approval of FECL.

Violetta F. Murshak

Violetta F. Murshak
Laboratory Director

FECL
Fire & Environmental Consulting Laboratories, Inc.
One East Complex 1451 East Lansing Drive, Suite 222 East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-6333

January 19, 1998

Attention: Mr. Paul Vial

Techna Corporation
44808 Helm Street
Plymouth, MI 48170-6026

Analytical Laboratory Report

FECL #(s): AA55620

Project: 00738-10A-003
Samples collected by: UNKNWON
Date/Time Submitted: 01/07/98 13:32
PO #: Verbal

FECL #: AA55620
Tag: Composite of Tandem Mill Pond SW/NE
Date/Time Collected: 12/15/97
Matrix: Sludge
Container(s): 1-Glass
Preservation: Refrigeration/None

FECL

Analytical Laboratory Report
Techna Corporation
January 19, 1998

FECL #: AA55620
Tag: Composite of Tandem Mill Pond SW/NE
Date/Time Collected: 12/15/97
Matrix: Sludge

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals						
Arsenic	Not detected	mg/L	0.005	200.8	P R	01/12/98
Barium	0.71	mg/L	0.01	200.8	P R	01/12/98
Cadmium	Not detected	mg/L	0.001	200.8	P R	01/12/98
Chromium	0.03	mg/L	0.01	200.8	P R	01/12/98
Copper	0.18	mg/L	0.01	200.8	P R	01/12/98
Lead	Not detected	mg/L	0.003	200.8	P R	01/12/98
Mercury	Not detected	mg/L	0.0002	245.1	E B	01/16/98
Selenium	Not detected	mg/L	0.005	200.8	P R	01/12/98
Silver	Not detected	mg/L	0.001	200.8	P R	01/12/98
Zinc	0.77	mg/L	0.01	200.8	P R	01/12/98
TCLP Extraction						
% Solids	100			1311	I M	01/11/98
Sample used g	100			1311	I M	01/11/98
Final Volume ml	2,000			1311	I M	01/11/98
Final Extract pH	5.42			1311	I M	01/11/98

Note: Methods may be modified for improved performance.
Results reported on a dry weight basis, where applicable.
Results relate only to items tested.
Report shall not be reproduced except in full, without the written approval of FECL.

Violetta F. Murshak

Violetta F. Murshak
Laboratory Director

FECL

Analytical Laboratory Report
Techna Corporation
August 25, 1997

FECL #: AA50326
Tag: GMW3
Date/Time Collected: 08/08/97 14:15
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	1.0	mg/L	0.1	350.3	MJC	08/14/97
Metals						
Arsenic	Not detected	mg/L	0.001	200.8	P R	08/23/97
Barium	0.02	mg/L	0.01	200.8	P R	08/23/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/23/97
Chromium	Not detected	mg/L	0.01	200.8	P R	08/23/97
Copper	Not detected	mg/L	0.01	200.8	P R	08/23/97
Lead	Not detected	mg/L	0.003	200.8	P R	08/23/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/22/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/23/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/23/97
Zinc	0.01	mg/L	0.01	200.8	P R	08/23/97
Organics						
BNA Extraction	Completed			625/8270	S G	08/13/97
Extraction, PCB	Completed				JKB	08/15/97
Volatile Organics						
Benzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromodichloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromoform	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromomethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Carbon tetrachloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
2-Chloroethylvinyl ether	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloroform	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Dibromochloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,3-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,4-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97

FECL #: AA50326 (Continued)
Tag: GMW3
Date/Time Collected: 08/08/97 14:15
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Volatile Organics (Continued)						
cis-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
trans-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichloropropane	Not detected	mg/L	0.001	8260	VFM	08/16/97
cis-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	08/16/97
trans-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Ethylbenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Methylene Chloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
Styrene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,2,2-Tetrachloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Tetrachloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Toluene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,1-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,2-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Trichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Trichlorofluoromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Vinyl Chloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
p,m-Xylene	Not detected	mg/L	0.001	8260	VFM	08/16/97
o-Xylene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Acetone	Not detected	mg/L	0.05	8260	VFM	08/16/97
2-Butanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
Carbon disulfide	Not detected	mg/L	0.05	8260	VFM	08/16/97
2-Hexanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
4-Methyl-2-pentanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
GC/MS Semi-Volatile Organics						
Acenaphthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Acenaphthylene	Not detected	mg/L	0.01	8270	JB	08/13/97
Anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzidine	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(a)anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(b)fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(k)fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(ghi)perylene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(a)pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chloroethoxy)methane	Not detected	mg/L	0.01	8270	JB	08/13/97

Analytical Laboratory Report
Techna Corporation
August 25, 1997

FECL #: AA50326 (Continued)
Tag: GMW3
Date/Time Collected: 08/08/97 14:15
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
Bis(2-chloroethyl)ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chlorisopropyl)ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-ethylhexyl)phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Bromophenyl phenyl ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Butyl benzyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Chloronaphthalene	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Chloro-3-methylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Chlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Chlorophenyl phenyl ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Chrysene	Not detected	mg/L	0.01	8270	JB	08/13/97
ibenzo(ah)anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Di-n-butyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,3-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,4-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
3,3'-Dichlorobenzidine	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Diethyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
Dimethyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
4,6-Dinitro-2-methylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dinitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dinitrotoluene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,6-Dinitrotoluene	Not detected	mg/L	0.01	8270	JB	08/13/97
Di-n-octyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
Fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Fluorene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorobutadiene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorocyclopentadiene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachloroethane	Not detected	mg/L	0.01	8270	JB	08/13/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Isophorone	Not detected	mg/L	0.01	8270	JB	08/13/97
Naphthalene	Not detected	mg/L	0.01	8270	JB	08/13/97
Nitrobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
-Nitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97

FECL #: AA50326 (Continued)
Tag: GMW3
Date/Time Collected: 08/08/97 14:15
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
4-Nitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitroso-di-n-butylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitrosodimethylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitorsodiphenylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitrosodi-n-propylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
Pentachlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Phenanthrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Phenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2,4-Trichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4,6-Trichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dimethylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
PCB						
PCB-1016	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1221	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1232	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1248	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1254	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1260	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1242	Not detected	mg/L	* 0.01	608	JB	08/20/97

FECL #: AA50327
Tag: GMW4
Date/Time Collected: 08/08/97 13:31
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	32.4	mg/L	0.1	350.3	MJC	08/14/97

Higher detection limits due to matrix interference and/or high target concentrations.

Analytical Laboratory Report
Techna Corporation
August 25, 1997

FECL #: AA50327 (Continued)
Tag: GMW4
Date/Time Collected: 08/08/97 13:31
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Metals						
Arsenic	Not detected	mg/L	0.001	200.8	P R	08/23/97
Barium	0.20	mg/L	0.01	200.8	P R	08/23/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/23/97
Chromium	Not detected	mg/L	0.01	200.8	P R	08/23/97
Copper	0.06	mg/L	0.01	200.8	P R	08/23/97
Lead	Not detected	mg/L	0.003	200.8	P R	08/23/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/22/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/23/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/23/97
Zinc	0.01	mg/L	0.01	200.8	P R	08/23/97
Organics						
BNA Extraction	Completed			625/8270	S G	08/13/97
Extraction, PCB	Completed				JKB	08/15/97
Volatile Organics						
Benzene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Bromodichloromethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
Bromoform	Not detected	mg/L	0.01	8260	VFM	08/16/97
Bromomethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
Carbon tetrachloride	Not detected	mg/L	0.01	8260	VFM	08/16/97
Chlorobenzene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Chloroethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
2-Chloroethylvinyl ether	Not detected	mg/L	0.01	8260	VFM	08/16/97
Chloroform	Not detected	mg/L	0.01	8260	VFM	08/16/97
Chloromethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
Dibromochloromethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,2-Dichlorobenzene	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,3-Dichlorobenzene	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,4-Dichlorobenzene	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,1-Dichloroethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,2-Dichloroethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,1-Dichloroethene	Not detected	mg/L	0.01	8260	VFM	08/16/97
cis-1,2-Dichloroethene	Not detected	mg/L	0.01	8260	VFM	08/16/97
trans-1,2-Dichloroethene	Not detected	mg/L	0.01	8260	VFM	08/16/97
2-Dichloropropane	Not detected	mg/L	0.01	8260	VFM	08/16/97

FECL #: AA50327 (Continued)
Tag: GMW4
Date/Time Collected: 08/08/97 13:31
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Volatile Organics (Continued)						
cis-1,3-Dichloropropene	Not detected	mg/L	0.01	8260	VFM	08/16/97
trans-1,3-Dichloropropene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Ethylbenzene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Methylene Chloride	Not detected	mg/L	0.01	8260	VFM	08/16/97
Styrene	Not detected	mg/L	0.01	8260	VFM	08/16/97
1.1,2,2-Tetrachloroethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
Tetrachloroethene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Toluene	Not detected	mg/L	0.01	8260	VFM	08/16/97
1.1,1-Trichloroethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
1,1,2-Trichloroethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
Trichloroethene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Trichlorofluoromethane	Not detected	mg/L	0.01	8260	VFM	08/16/97
Vinyl Chloride	Not detected	mg/L	0.01	8260	VFM	08/16/97
p,m-Xylene	Not detected	mg/L	0.01	8260	VFM	08/16/97
o-Xylene	Not detected	mg/L	0.01	8260	VFM	08/16/97
Acetone	Not detected	mg/L	0.5	8260	VFM	08/16/97
2-Butanone	Not detected	mg/L	0.5	8260	VFM	08/16/97
Carbon disulfide	Not detected	mg/L	0.5	8260	VFM	08/16/97
2-Hexanone	Not detected	mg/L	0.5	8260	VFM	08/16/97
4-Methyl-2-pentanone	Not detected	mg/L	0.5	8260	VFM	08/16/97
GC/MS Semi-Volatile Organics						
Acenaphthene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Acenaphthylene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Anthracene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Benzidine	Not detected	mg/L	*0.05	8270	JB	08/13/97
Benzo(a)anthracene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Benzo(b)fluoranthene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Benzo(k)fluoranthene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Benzo(ghi)perylene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Benzo(a)pyrene	Not detected	mg/L	*0.05	8270	JB	08/13/97
Bis(2-chloroethoxy)methane	Not detected	mg/L	*0.05	8270	JB	08/13/97
Bis(2-chloroethyl)ether	Not detected	mg/L	*0.05	8270	JB	08/13/97
Bis(2-chlorisopropyl)ether	Not detected	mg/L	*0.05	8270	JB	08/13/97
Bis(2-ethylhexyl)phthalate	Not detected	mg/L	*0.05	8270	JB	08/13/97

* Higher detection limits due to matrix interference and/or high target concentrations.

FECL

Analytical Laboratory Report
Techna Corporation
August 25, 1997

FECL #: AA50327 (Continued)
Tag: GMW4
Date/Time Collected: 08/08/97 13:31
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
4-Bromophenyl phenyl ether	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Butyl benzyl phthalate	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2-Chloronaphthalene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
4-Chloro-3-methylphenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2-Chlorophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
4-Chlorophenyl phenyl ether	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Chrysene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Dibenzo(ah)anthracene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Di-n-butyl phthalate	Not detected	mg/L	* 0.05	8270	JB	08/13/97
1,2-Dichlorobenzene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
,3-Dichlorobenzene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
,4-Dichlorobenzene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
3,3'-Dichlorobenzidine	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2,4-Dichlorophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Diethyl phthalate	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Dimethyl phthalate	Not detected	mg/L	* 0.05	8270	JB	08/13/97
4,6-Dinitro-2-methylphenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2,4-Dinitrophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2,4-Dinitrotoluene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2,6-Dinitrotoluene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Di-n-octyl phthalate	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Fluoranthene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Fluorene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Hexachlorobenzene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Hexachlorobutadiene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Hexachlorocyclopentadiene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Hexachloroethane	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Isophorone	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Naphthalene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Nitrobenzene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2-Nitrophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
4-Nitrophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
N-Nitroso-di-n-butylamine	Not detected	mg/L	* 0.05	8270	JB	08/13/97
N-Nitrosodimethylamine	Not detected	mg/L	* 0.05	8270	JB	08/13/97

* Higher detection limits due to matrix interference and/or high target concentrations.

FECL #: AA50327 (Continued)
Tag: GMW4
Date/Time Collected: 08/08/97 13:31
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
N-Nitorsodiphenylamine	Not detected	mg/L	* 0.05	8270	JB	08/13/97
N-Nitrosodi-n-propylamine	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Pentachlorophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Phenanthrene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
Phenol	0.43	mg/L	* 0.05	8270	JB	08/13/97
Pyrene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
1,2,4-Trichlorobenzene	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2,4,6-Trichlorophenol	Not detected	mg/L	* 0.05	8270	JB	08/13/97
2,4-Dimethylphenol	1.52	mg/L	* 0.05	8270	JB	08/13/97
PCB						
CB-1016	Not detected	mg/L	* 0.001	608	JB	08/20/97
PCB-1221	Not detected	mg/L	* 0.001	608	JB	08/20/97
PCB-1232	Not detected	mg/L	* 0.001	608	JB	08/20/97
PCB-1248	Not detected	mg/L	* 0.001	608	JB	08/20/97
PCB-1254	Not detected	mg/L	* 0.001	608	JB	08/20/97
PCB-1260	Not detected	mg/L	* 0.001	608	JB	08/20/97
PCB-1242	Not detected	mg/L	* 0.001	608	JB	08/20/97

FECL #: AA50328
Tag: GMW5
Date/Time Collected: 08/08/97 13:51
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	1.8	mg/L	0.1	350.3	MJC	08/14/97
Metals						
Arsenic	Not detected	mg/L	0.001	200.8	P R	08/23/97
Barium	0.05	mg/L	0.01	200.8	P R	08/23/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/23/97
Chromium	Not detected	mg/L	0.01	200.8	P R	08/23/97

* Higher detection limits due to matrix interference and/or high target concentrations.

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FECL #: AA50329 (Continued)
Tag: GMW6
Date/Time Collected: 08/08/97 14:00
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
Pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2,4-Trichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4,6-Trichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dimethylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97

FECL #: AA50330
Tag: GMW7
Date/Time Collected: 08/08/97 13:18
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	1.3	mg/L	0.1	350.3	MJC	08/14/97
Metals						
Arsenic	Not detected	mg/L	0.001	200.8	P R	08/23/97
Barium	0.02	mg/L	0.01	200.8	P R	08/23/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/23/97
Chromium	Not detected	mg/L	0.01	200.8	P R	08/23/97
Copper	Not detected	mg/L	0.01	200.8	P R	08/23/97
Lead	Not detected	mg/L	0.003	200.8	P R	08/23/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/22/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/23/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/23/97
Zinc	0.02	mg/L	0.01	200.8	P R	08/23/97
Organics						
BNA Extraction	Completed			625/8270	S G	08/13/97
Extraction, PCB	Completed				JKB	08/15/97

FECL #: AA50330 (Continued)
Tag: GMW7
Date/Time Collected: 08/08/97 13:18
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Volatile Organics						
Benzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromodichloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromoform	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromomethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Carbon tetrachloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
2-Chloroethylvinyl ether	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloroform	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Dibromochloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,3-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,4-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
cis-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
trans-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichloropropane	Not detected	mg/L	0.001	8260	VFM	08/16/97
cis-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	08/16/97
trans-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Ethylbenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Methylene Chloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
Styrene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,2,2-Tetrachloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Tetrachloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Toluene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,1-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,2-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Trichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Trichlorofluoromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Vinyl Chloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
p,m-Xylene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Xylene	Not detected	mg/L	0.001	8260	VFM	08/16/97

FECL #: AA50330 (Continued)
Tag: GMW7
Date/Time Collected: 08/08/97 13:18
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Volatile Organics (Continued)						
Acetone	Not detected	mg/L	0.05	8260	VFM	08/16/97
2-Butanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
Carbon disulfide	Not detected	mg/L	0.05	8260	VFM	08/16/97
2-Hexanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
4-Methyl-2-pentanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
GC/MS Semi-Volatile Organics						
Acenaphthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Acenaphthylene	Not detected	mg/L	0.01	8270	JB	08/13/97
Anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzidine	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(a)anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(b)fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(k)fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(ghi)perylene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(a)pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chloroethoxy)methane	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chloroethyl)ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chlorisopropyl)ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-ethylhexyl)phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Bromophenyl phenyl ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Butyl benzyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Chloronaphthalene	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Chloro-3-methylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Chlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Chlorophenyl phenyl ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Chrysene	Not detected	mg/L	0.01	8270	JB	08/13/97
Dibenzo(ah)anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Di-n-butyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,3-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,4-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
3,3'-Dichlorobenzidine	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Diethyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97

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FECL #: AA50330 (Continued)
Tag: GMW7
Date/Time Collected: 08/08/97 13:18
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
Dimethyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
4,6-Dinitro-2-methylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dinitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dinitrotoluene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,6-Dinitrotoluene	Not detected	mg/L	0.01	8270	JB	08/13/97
Di-n-octyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
Fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Fluorene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorobutadiene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorocyclopentadiene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachloroethane	Not detected	mg/L	0.01	8270	JB	08/13/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Isophorone	Not detected	mg/L	0.01	8270	JB	08/13/97
Naphthalene	Not detected	mg/L	0.01	8270	JB	08/13/97
Nitrobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Nitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Nitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitroso-di-n-butylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitrosodimethylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitorsodiphenylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitrosodi-n-propylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
Pentachlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Phenanthrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Phenol	0.04	mg/L	0.01	8270	JB	08/13/97
Pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2,4-Trichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4,6-Trichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dimethylphenol	0.07	mg/L	0.01	8270	JB	08/13/97

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FECL #: AA50330 (Continued)
Tag: GMW7
Date/Time Collected: 08/08/97 13:18
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
PCB						
PCB-1016	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1221	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1232	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1248	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1254	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1260	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1242	Not detected	mg/L	* 0.01	608	JB	08/20/97

FECL #: AA50331
Tag: GMW8
Date/Time Collected: 08/08/97 13:05
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	0.5	mg/L	0.1	350.3	MJC	08/14/97
Metals						
Arsenic	Not detected	mg/L	0.001	200.8	P R	08/23/97
Barium	0.02	mg/L	0.01	200.8	P R	08/23/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/23/97
Chromium	Not detected	mg/L	0.01	200.8	P R	08/23/97
Copper	Not detected	mg/L	0.01	200.8	P R	08/23/97
Lead	Not detected	mg/L	0.003	200.8	P R	08/23/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/22/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/23/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/23/97
Zinc	0.02	mg/L	0.01	200.8	P R	08/23/97
Organics						
BNA Extraction	Completed			625/8270	S G	08/13/97
Extraction, PCB	Completed				JKB	08/15/97

* Higher detection limits due to matrix interference and/or high target concentrations.

FECL

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FECL #: AA50337
Tag: GMW4D
Date/Time Collected: 08/08/97 13:26
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	0.8	mg/L	0.1	350.3	MJC	08/14/97
Metals						
Arsenic	Not detected	mg/L	0.001	200.8	P R	08/23/97
Barium	0.02	mg/L	0.01	200.8	P R	08/23/97
Cadmium	Not detected	mg/L	0.0002	200.8	P R	08/23/97
Chromium	Not detected	mg/L	0.01	200.8	P R	08/23/97
Copper	Not detected	mg/L	0.01	200.8	P R	08/23/97
Lead	Not detected	mg/L	0.003	200.8	P R	08/23/97
Mercury	Not detected	mg/L	0.0002	245.1	E B	08/22/97
Selenium	Not detected	mg/L	0.005	200.8	P R	08/23/97
Silver	Not detected	mg/L	0.0005	200.8	P R	08/23/97
Zinc	0.01	mg/L	0.01	200.8	P R	08/23/97
Organics						
BNA Extraction	Completed			625/8270	S G	08/13/97
Extraction, PCB	Completed				JKB	08/15/97
Volatile Organics						
Benzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromodichloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromoform	Not detected	mg/L	0.001	8260	VFM	08/16/97
Bromomethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Carbon tetrachloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
2-Chloroethylvinyl ether	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloroform	Not detected	mg/L	0.001	8260	VFM	08/16/97
Chloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Dibromochloromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,3-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,4-Dichlorobenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97

FECL #: AA50337 (Continued)
Tag: GMW4D
Date/Time Collected: 08/08/97 13:26
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
Volatile Organics (Continued)						
cis-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
trans-1,2-Dichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,2-Dichloropropane	Not detected	mg/L	0.001	8260	VFM	08/16/97
cis-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	08/16/97
trans-1,3-Dichloropropene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Ethylbenzene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Methylene Chloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
Styrene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,2,2-Tetrachloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Tetrachloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Toluene	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,1-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
1,1,2-Trichloroethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Trichloroethene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Trichlorofluoromethane	Not detected	mg/L	0.001	8260	VFM	08/16/97
Vinyl Chloride	Not detected	mg/L	0.001	8260	VFM	08/16/97
p,m-Xylene	Not detected	mg/L	0.001	8260	VFM	08/16/97
o-Xylene	Not detected	mg/L	0.001	8260	VFM	08/16/97
Acetone	Not detected	mg/L	0.05	8260	VFM	08/16/97
2-Butanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
Carbon disulfide	Not detected	mg/L	0.05	8260	VFM	08/16/97
2-Hexanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
4-Methyl-2-pentanone	Not detected	mg/L	0.05	8260	VFM	08/16/97
GC/MS Semi-Volatile Organics						
Acenaphthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Acenaphthylene	Not detected	mg/L	0.01	8270	JB	08/13/97
Anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzidine	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(a)anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(b)fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(k)fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(ghi)perylene	Not detected	mg/L	0.01	8270	JB	08/13/97
Benzo(a)pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chloroethoxy)methane	Not detected	mg/L	0.01	8270	JB	08/13/97

FECL

Analytical Laboratory Report
Techna Corporation
August 25, 1997

FECL #: AA50337 (Continued)
Tag: GMW4D
Date/Time Collected: 08/08/97 13:26
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
Bis(2-chloroethyl)ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-chlorisopropyl)ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Bis(2-ethylhexyl)phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Bromophenyl phenyl ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Butyl benzyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Chloronaphthalene	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Chloro-3-methylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Chlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
4-Chlorophenyl phenyl ether	Not detected	mg/L	0.01	8270	JB	08/13/97
Chrysene	Not detected	mg/L	0.01	8270	JB	08/13/97
Dibenzo(ah)anthracene	Not detected	mg/L	0.01	8270	JB	08/13/97
Di-n-butyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,3-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,4-Dichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
3,3'-Dichlorobenzidine	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Diethyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
Dimethyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
4,6-Dinitro-2-methylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dinitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dinitrotoluene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,6-Dinitrotoluene	Not detected	mg/L	0.01	8270	JB	08/13/97
Di-n-octyl phthalate	Not detected	mg/L	0.01	8270	JB	08/13/97
Fluoranthene	Not detected	mg/L	0.01	8270	JB	08/13/97
Fluorene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorobutadiene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachlorocyclopentadiene	Not detected	mg/L	0.01	8270	JB	08/13/97
Hexachloroethane	Not detected	mg/L	0.01	8270	JB	08/13/97
Indeno(1,2,3-cd)pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Isophorone	Not detected	mg/L	0.01	8270	JB	08/13/97
Naphthalene	Not detected	mg/L	0.01	8270	JB	08/13/97
Nitrobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
2-Nitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97

FECL #: AA50337 (Continued)
Tag: GMW4D
Date/Time Collected: 08/08/97 13:26
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Organics (Continued)						
GC/MS Semi-Volatile Organics (Continued)						
4-Nitrophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitroso-di-n-butylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitrosodimethylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitorsodiphenylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
N-Nitrosodi-n-propylamine	Not detected	mg/L	0.01	8270	JB	08/13/97
Pentachlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Phenanthrene	Not detected	mg/L	0.01	8270	JB	08/13/97
Phenol	Not detected	mg/L	0.01	8270	JB	08/13/97
Pyrene	Not detected	mg/L	0.01	8270	JB	08/13/97
1,2,4-Trichlorobenzene	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4,6-Trichlorophenol	Not detected	mg/L	0.01	8270	JB	08/13/97
2,4-Dimethylphenol	Not detected	mg/L	0.01	8270	JB	08/13/97
PCB						
PCB-1016	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1221	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1232	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1248	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1254	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1260	Not detected	mg/L	* 0.01	608	JB	08/20/97
PCB-1242	Not detected	mg/L	* 0.01	608	JB	08/20/97

FECL #: AA50338
Tag: GDup
Date/Time Collected: 08/08/97
Matrix: Groundwater

Analysis	Results	Units	MRL	Method	Analyst	Date Run
Inorganics						
Ammonia	35.6	mg/L	0.1	350.3	MJC	08/14/97

* Higher detection limits due to matrix interference and/or high target concentrations.

Appendix D – Continuing Emergency Measures During Tandem Mill Pond Closure

Continuing Emergency Measures During Tandem Mill Pond Closure
Amendment to the Continuing Emergency Measures Work Plan

DSC will conduct an interim response activity (IRA) at the Tandem Mill Pond (TMP). The purpose of the IRA is to remove and treat petroleum and phenol contaminated soils, sediments and rag in and around the TMP. The pond will be drained, and soil, rag and sediment will be excavated and consolidated into a single area and covered. The IRA for the TMP is described in the Interim Response Activity Work Plan (Work Plan) for the Tandem Mill Pond. The IRA Work Plan has been reviewed by the Michigan Department of Environmental Quality (MDEQ). The IRA Work Plan is being revised in response to MDEQ comments, and will be resubmitted to MDEQ.

During the IRA, DSC will pump water from the TMP to the facility wastewater treatment system. The water will be handled and processed to prevent the discharge of oil to the other ponds in the facility wastewater treatment system. All inflows to the TMP will be diverted to other locations. Areas of rag and oily sediment on the banks and the bottom of the TMP will become exposed as the water level in the TMP is lowered. In order to prevent wildlife exposure to oily soil and sediment exposed during draining of the pond, additional measures will be instituted. This appendix describes these additional measures, which will include the following steps:

- Delay TMP dewatering until the end of the spring migration seasons (after June 1, 2000)
- Increase the dewatering flow rate (subject to meeting NPDES permit requirements)
- Instruct all contractor and subcontractor personnel working on the IRA in the goals and procedures of the CEM Work Plan
- Cover oily embankments and sediment using a spray applied latex membrane
- Install bird netting over oily sediments or soil that pose a hazard to wildlife and cannot be covered by the spray applied membrane
- Excavate, consolidate and cover oily sediments or soil

These measures are described in more detail in the following paragraphs. These measures will also be included in the revised IRA Work Plan for the Tandem Mill Pond submitted to MDEQ. During draining of the pond, DSC will continue to implement the continuing emergency measures as described in the CEM Work Plan, including the monitoring and reporting requirements.

In order to prevent exposing additional areas of oily sediment or soil during migration season, DSC will not begin to dewater the TMP until June 1, 2000, at the earliest. DSC previously began limited pumping of water from the TMP, as observed by EPA personnel on April 12, 2000. DSC has discontinued pumping water from the TMP, and has allowed the water level in the pond to recover to its previous level. The water surface will be maintained at this level until DSC begins the IRA. The IRA start date is subject to the approval of the MDEQ. DSC anticipates that MDEQ review of the IRA Work Plan will be completed in sufficient time to complete dewatering before the beginning of the fall migration season. If the approval of the IRA Work Plan is delayed to the extent that dewatering will occur during the fall migration

season, then DSC will evaluate whether additional emergency measures will be required to comply with the Administrative Order.

The IRA Work Plan proposed to limit the TMP pumping rate to 200,000 gallons per day (gpd). Subject to continued compliance with the facility's wastewater discharge permit, DSC will increase the pumping rate from the TMP to at least 300,000 gpd. This will decrease the estimated time required to drain the TMP from 65 days to 43 days. From May 1 to September 30, the facility's wastewater discharge must meet an oxygen demand limit of 38.6 milligrams per liter (mg/l) and an ammonia limit of 5 mg/l. If the wastewater treatment system is not able to meet the discharge requirements at the higher flow rate, DSC will return the flow rate to 200,000 gpd.

While the TMP is being drained, additional contractor and subcontractor personnel will be present in and around the TMP to implement remedial activities. Contractors and subcontractors will be on-site during hours when the daily inspection patrols are not present, and their presence is expected to serve as a continuing deterrent to wildlife. In addition, DSC will instruct contractor and subcontractor personnel in the terms of the Administrative Order, and the goals and procedures of the CEM Work Plan. In particular, contractor and subcontractor personnel will be instructed to report any wildlife observed near the pond.

Areas of oily soil or sediment exposed by draining the TMP will be covered with a flexible latex membrane. A polymer latex mixture will be applied using a surfactant solution as a dispersant (Rusmar Long Duration Foam or equal). The surfactant solution is sprayed onto the area to be covered. As the air bubbles in the foam collapse, the latex coagulates to form a continuous flexible membrane that adheres to horizontal and sloping surfaces, including irregular surfaces such as will be encountered in the TMP. The latex membrane will prevent direct contact between wildlife and the soil and sediment. The latex/surfactant solution can be formulated to retain its integrity for up to six months. The material is biodegradable and is not expected to affect the treatment of soil and sediment from the TMP. A product information sheet and an MSDS sheet for the long duration foam material is attached.

Exposed areas of sediment will be sprayed with the long duration foam at the end of each work day. Personnel may not be able to access some areas of the pond immediately after they have been drained. If oily sediment cannot be spray covered, and presents a risk of wildlife exposure, DSC will install bird netting over those areas.

Some areas of oily soil or sediment exposed during draining of the TMP may be temporarily consolidated into piles and covered with erosion control fabric or other material. Soil or sediment may be removed to begin the construction of the disposal area, to provide safer working conditions, or to expose areas for sampling. Any temporary piles of consolidated material will be covered with a degradable erosion control blanket. The blanket will consist of straw and/or coconut fiber covered on the top and bottom with heavyweight polypropylene netting (maximum 0.75 inch square mesh size). The consolidated material will be covered at the end of each work day.

PRODUCT DATA SHEET

LONG DURATION FOAM

AC-900 SERIES

GENERAL DESCRIPTION

The AC-900 Series Long Duration Foam products produce an impermeable, flexible membrane that seals a surface to prevent emissions. AC-900 Series foam products utilize foam as a distribution method for latex. After the foam has been applied, the air bubbles begin to collapse and the latex coagulates to form a continuous flexible membrane that adheres to the substrate. AC-900 Series products are designed for use with Rusmar Pneumatic Foam Units.

AC-900 Series foams are recognized by the Environmental Protection Agency and the U.S. Army Corps of Engineers as providing superior emission control for periods from 2 weeks up to 6 months. AC-900 Series foams have been specified for use at Superfund and other hazardous waste sites across the United States and Canada.

FEATURES

- Adheres to vertical and irregular surfaces
- Completely controls odors & VOC's
- Prevents erosion
- Easy to use, no mixing necessary
- Available in black, red, green or brown
- Non-hazardous
- Controls dusting
- Repels water
- No temperature limitations
- More effective than tarps

APPLICATIONS

AC-900 Series Long Duration Foam products have numerous applications in landfills and remediation projects.

ODOR AND VOC CONTROL

As a medium for controlling odors and VOC's, AC-900 Series has proven to be very effective with diverse applications:

- Extended odor & VOC control of open excavations or exposed trash.
- Extended odor & VOC control of stockpiled soils or debris.
- Special odor control problems, such as sewage sludge.
- Baled trash cover – the membrane seals the surface completely.

RUSMAR INCORPORATED, 216 Garfield Avenue, West Chester, PA 19380
610-436-4314 phone • 610-436-8436 fax
www.rusmarinc.com

FUGITIVE DUST
Exposed soil can often become a dust problem in windy locations, presenting a potential health hazard. Hazardous waste sites, receiving periodic shipments of dusty materials, can prevent windorne dusting by immediately applying AC-900 Series foam.

- No need to mobilize equipment to immediately cover with soil or tarps.
- Extended dust control of stockpiled soils or debris.

EROSION CONTROL
Graded areas can be covered with AC-900 Series Membrane reducing erosion damage caused by rain, melting snow or ice and wind.

- On outside slopes of the landfill – prevents trash from being exposed
- On new liners – compacted clay can be protected from weather before a plastic liner or select trash is put down.

SEALING HIGH PERCOLATION SOILS
Sand and other high percolation soils do not effectively repel rain water or melting snow and ice. Covering areas with AC-900 Series foam dramatically reduces soil permeability.

- Improved run-off from inside surfaces of the landfill
- Reduced leachate generation

WASTE TRANSPORTATION
Trucks or railcars transporting trash, odorous or dusty materials can be quickly covered with AC-900 Series foam to form a complete barrier between emissions and the atmosphere.

- No wind blown losses
- Produces a better visual appearance

METHOD OF APPLICATION

AC-900 Series Long Duration Foam products are supplied in either 450 pound drums or by bulk load (approximately 46,000 pounds). Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon heated and stirred chemical storage tank and a microprocessor to accurately transfer the chemical.

AC-900 Series products are designed to be applied with a Rusmar Pneumatic Foam Unit. The Pneumatic Foam Units are available in a variety of sizes to accommodate a range of site conditions and application needs.

RUSMAR INCORPORATED, 216 Garfield Avenue, West Chester, PA 19380
610-436-4314 phone • 610-436-8436 fax
www.rusmarinc.com

Emissions Control

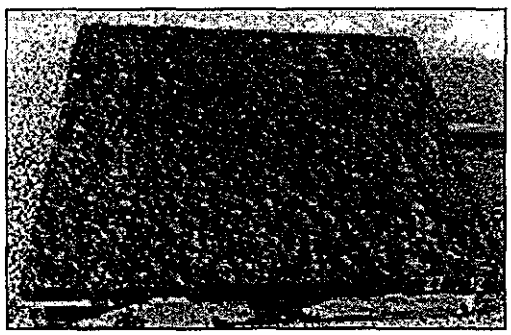
Providing A Solution

The clean up of hazardous waste in contaminated soils often requires unique solutions to control emissions of dust, odors, and Volatile Organic Compounds (VOC's) during excavation and storage. Accepted by the E.P.A. and the U.S. Army Corps of Engineers, Rusmar Long Duration Foam provides immediate control and is a cost-effective solution for meeting emission control requirements.

What is it?

Long Duration Foam forms a mechanical barrier which is independent of the substrate. It is non-reactive, biodegradable and non-hazardous. It comes in two forms:

AC-600 Series foams are water based non-hardening foams which can be applied during excavation and for overnight or weekend coverage to prevent emissions. To minimize freight costs, the foam is shipped in concentrated form in 450 lb. drums or by tanker load. It is diluted with water at the site.



AC-900 Series Long Duration Foam products are single component, direct-use materials that form an impermeable flexible membrane. As the Long Duration Foam cures through evaporation and draining, a membrane forms over the surface. Membrane durations are from two weeks up to six months. AC-900 Series foam will promote surface water run-off while preventing soil erosion. AC-900 foam is shipped in 450 lb. drums or by tanker load.

Neither the AC-600 nor the AC-900 Series foams use components which must be mixed prior to use. No after application clean-up is required and it is not necessary to use all of the product at once.

How is it applied?

The foam is made by the injection of compressed air using a Pneumatic Foam Unit (PFU). The foam is applied via hose line to form a blanket three to six inches thick. AC-600 Series foam is white/tan with the consistency of shaving cream; AC-900 Series foam is black. Brown, red or green color can be added to AC-900 Series to either enhance or mask visibility; pleasant wintergreen or vanilla scents can be added to both AC-600 or AC-900 Series. Long Duration Foam can be applied to solid, liquid and vertical surfaces.

MATERIAL SAFETY DATA SHEET

AC-900 SERIES

SECTION I: GENERAL INFORMATION

Manufacturer's Name: RUSMAR INCORPORATED
Manufacturer's Address: 216 Garfield Avenue
West Chester, PA 19380
Manufacturer's Phone No.: 610-436-4314
Chemical Family: Aqueous anionic surfactant, polymer latex mixture
Trade Name: RUSMAR AC-900

SECTION II: HAZARDOUS INGREDIENTS

Paints, Preservatives, and Solvents -- None
Alloys and Metallic Coatings -- None
Hazardous Mixtures and Other Materials -- None

SECTION III: PHYSICAL DATA

Boiling Point: 100°C
Specific Gravity: 1.01 to 1.06
Vapor Pressure: 25mm Hg at 25°C
% Volatile, By Volume: None
Vapor Density (Air = 1): N/A
Evaporation Rate: N/A
Water Solubility: Complete
Appearance/Odor: Opaque, gray, viscous liquid

SECTION IV: FIRE AND EXPLOSION HAZARD DATA

Flash Point (Method): Nonflammable
Flammable Limits: N/A
Extinguishing Media: N/A
Special Fire Fighting Procedures: None
Unusual Fire and/or Explosion Hazards: None

SECTION V: HEALTH HAZARD DATA

Threshold Limit Value: Not Determined

Effects of Overexposure: This material is not expected to present an inhalation or ingestion hazard. It may cause an eye or skin irritation upon direct contact.

Emergency and First Aid Procedures: Wash thoroughly with clean water.

SECTION VI: REACTIVITY DATA

Stability: Material is stable. This material will likely coagulate if frozen.

Incompatibility: Addition of other materials may cause coagulation.

Hazardous Decomposition Products: Low levels of sulfur oxides on combustion. Dense, black smoke.

Polymerization will not occur.

SECTION VII: SPILL OR LEAK PROCEDURES

Steps to be taken in case material is released or spilled: if spilled indoors on a hard surface, the spill area may be slippery and should be thoroughly washed with water. Contain spill and absorb material with dirt or another appropriate absorbent.

Waste Disposal Method: This material has only a modest BOD and can be deposited in sewers and should be flushed with copious amounts of water. The material can be disposed of in approved landfill; dried waste may be incinerated.

SECTION VIII: SPECIAL PROTECTION INFORMATION

Respirator Protection: None required for normal operations

Ventilation: No special requirements

Protective Gloves: Not required, but recommended

Eye Protection: Not required, but recommended

Other Protective Equipment: None

SECTION IX: SPECIAL PRECAUTIONS

Storing/Handling Precautions: Avoid excessive heat. Material will freeze, thawing will NOT return product to usable form in most cases.

Other Precautions: None

Final Chronic Values (FCVs) for the protection of aquatic life were calculated as provided in Footnote G to the Part 201 Generic Cleanup Criteria and Screening Levels tables, using a calculation spreadsheet provided by MDEQ. A hardness concentration of 100 mg/l was used in the calculations, based on hardness values measured in the Detroit River according to the following sources:

Source of Data	Total Hardness	Comments
USGS Detroit River station	99 mg/l	Values measured between 1973 and 1986, n=138.
City of Detroit Water and Sewerage Department	107 mg/l	Single sample at Southwest Plant, 11/99
Kauss and Handy, 1985	96 mg/l	Measured in Trenton channel, 1982-83, n=2
DSC	160 mg/l	Single sample from Trenton Channel, 1/00

Appendix E – Part 201 Criteria Calculations

FOOTNOTES

{A} Criterion is the State of Michigan Drinking Water Standard established pursuant to Section 5 of the Safe Drinking Water Act, Act No. 399 of the Public Acts of 1976.

{B} Background, as defined in Rule 299.5701(c), may be substituted if higher than the calculated cleanup criteria. Background levels may not exceed criteria for all inorganic compounds.

{C} Value presented is a screening level based on the chemical-specific generic soil saturation concentration (Csat) since the calculated risk-based criterion is greater than Csat. Concentrations greater than Csat are acceptable cleanup criteria for this pathway where a site-specific demonstration indicates that free-phase contaminant is not present. Consult the Generic Soil Saturation Concentrations: Technical Support Document (August 31, 1998) for further guidance on development of site-specific Csat values. Risk-based criteria are available by contacting an ERD toxicologist.

{D} Calculated criterion exceeds 100%, hence it is reduced to 100% (i.e., 1.0E+9 ppb). Evaluation of free phase contaminant, environmental impacts, adverse aesthetics and acute or local toxicity is required.

{E} Criterion is the aesthetic drinking water value, as required by Sec. 20120(1)(5). A Notice of Aesthetic Impact may be employed as an institutional control mechanism where groundwater concentrations exceed the aesthetic DWC, but do not exceed the applicable health-based DWC. Health-based DWC are provided in the table below.

Hazardous Substance	CAS #	Residential Health-Based DWC	Industrial-Commercial Health-Based DWC
Aluminum	7429905	300	4,100
Chloride	16887006	ID	ID
Copper	7440508	1,400	4,000
Diethyl ether	60297	3,700	10,000
Ethylbenzene	100414	700	700
Iron	7439896	2,000	5,600
Manganese	7439965	860	2,500
Methyl-tert-butyl ether (MTBE)	1634044	240	690
Sulfate	14808798	ID	ID
Toluene	108883	1,000	1,000
1,2,4-Trimethylbenzene	95636	1,000	2,900
1,3,5-Trimethylbenzene	108678	1,000	2,900
Xylenes	1330207	10,000	10,000

{F} Criterion is based on adverse impacts to plant life (i.e., phytotoxicity).

{G} GSI criterion is pH or water hardness dependent. The Final Chronic Value (FCV) for the protection of aquatic life must be calculated based on the pH or hardness of the receiving surface water. Where water hardness exceeds 400 mg $CaCO_3$/L, use 400 mg $CaCO_3$/L for the FCV calculation. The FCV formula provides values in units of ug/L (ppb). The generic GSI criterion is the lesser of the calculated FCV, the wildlife value (WV) and the surface water human non-drinking water value (HNDV). The soil GSI protection criteria for these hazardous substances are the greater of the 20 X GSI and the GSI soil-water partition values using the GSI criteria developed with the procedure described in this footnote.

Hazardous Substance	FCV Formula ug/L	FCV Conversion Factor (CF)	WV ug/L	HNDV ug/L
Barium®	EXP(1.0629*(LnH)+1.1869)	NA	NA	1.6E+5
Beryllium	EXP(2.5279*(LnH)-10.7689)	NA	NA	1,200
Cadmium®	(EXP(0.7852*(LnH)-2.715))*CF	1.101672-((LnH)*0.04184)	NA	130
Chromium (III) ®	(EXP(0.819*(LnH)+0.6848))*CF	0.86	NA	9,400
Copper	(EXP(0.8545*(LnH)-1.702)) *CF	0.96	NA	64,000
Lead®	(EXP(1.273*(LnH)-3.296))*CF	1.46203-((LnH)*0.14571)	NA	190
Manganese	EXP(0.8784*(LnH)+2.226)	NA	NA	59,000

Hazardous Substance	FCV Formula ug/L	FCV Conversion Factor (CF)	WV ug/L	HNDV ug/L
Nickel	(EXP(0.846*(LnH)+0.0584))*CF	0.997	NA	2.1E+5
Pentachlorophenol[⊗]	EXP(1.005*(pH)-5.134)	NA	NA	2.8
Zinc	(EXP(0.8473*(LnH)+0.884))*CF	0.986	NA	22,000

Where,

EXP(x) = The base of the natural logarithm raised to power x (e^x).
LnH = The natural logarithm of water hardness in mg $CaCO_3$/L.
SS = Total suspended solids in mg/L.
* = The multiplication symbol.
⊗ = The GSI criterion developed here may not be protective for surface water that is used as a drinking water source. Refer to footnote {X} for further guidance.

A spreadsheet that may be used to calculate GSI and GSI PC for {G} footnoted hazardous substances is available at http://www.deq.state.mi.us/erd.

{H} Valence-specific chromium data (Cr III and Cr VI) must be compared to the corresponding valence-specific cleanup criteria. If both Cr III and Cr VI are present in groundwater, the total concentration of both cannot exceed the DWC of 100 ug/l. If analytical data are provided for "total" chromium only, then values for Cr VI must be applied as the cleanup criteria. Cr III cleanup criterion for protection of drinking water can only be used at sites where groundwater is prevented from being used as a public water supply, currently and in the future.

{I} Hazardous substance may exhibit the characteristic of ignitability as defined in 40 CFR 261.21.

{J} Hazardous substance may be present in several isomer forms. Isomer-specific concentrations must be added together for comparison to criteria.

{K} Hazardous substance may be flammable and/or explosive.

{L} Reserved

{M} Calculated criterion is below the analytical Target Detection Limit (TDL), therefore, the criterion defaults to the TDL.

{N} The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater used as a source of drinking water must not, when added together, exceed the nitrate DWC of 10,000 ug/L. Where leaching to groundwater is a relevant pathway, soil concentrations of all potential sources of nitrate-nitrogen must not, when added together, exceed the nitrate DWPC of 2.0E+5 ug/Kg.

{O} All polychlorinated and polybrominated dibenzodioxins and dibenzofurans are considered as one hazardous substance. The concentration of all isomers present at a facility, expressed as an equivalent concentration of 2,3,7,8-tetrachlorodibenzo-p-dioxin based upon their relative potency, must be added together and compared to the criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin. The generic criteria revisions have not been incorporated into the criteria for 2,3,7,8-tetrachlorodibenzo-p-dioxin, therefore the criteria listed is the same as shown in the May 28, 1999 criteria tables.

{P} Amenable or Method OIA-1677 analysis are used to quantify cyanide concentrations for compliance with all groundwater criteria. Total, amenable, or Method OIA-1677 analysis may be used to quantify cyanide concentrations for compliance with soil criteria. Industrial/commercial DCC may not be protective of the potential for release of hydrogen cyanide (HCN) gas. Additional

Calculation of Generic Facility-Specific Part 201 Groundwater Surface Water Interface (GSI) Criteria for {G} Footnoted Hazardous Substances

Directions for calculating generic facility-specific GSI criteria:

1. Enter "hardness" (Column B) or "pH" (Column C). Click the green check mark to the left of the Excel formula bar or press the "Enter" key.
2. The GSI criteria for surface water **not** protected as a source of drinking water are the lower of the FCV, WV and HNDV. This criteria appears in Column I.
3. The GSI criteria for surface water protected as a source of drinking water are the lower of the FCV, WV and HDV. Surface water protected as a source of drinking water includes the Great Lakes and their connecting waters, and inland surface water in close proximity to a water supply intake. This criteria appears in Column J. Refer to Part 201 Criteria Application Guidesheet #3 for further guidance on selecting the applicable GSI criterion.

Calculate GSI in ug/L (ppb)									
Hazardous Substance	* ENTER Hardness In mg CaCO3/L	* ENTER pH	FCV Conversion Factor	Final Chronic Value (FCV)	Wildlife Value (WV)	Surface Water Human Non-Drinking Water Value (HNDV)	Surface Water Human Drinking Water Value (HDV)	GSI Criteria for Surface Water Not Protected for Drinking Water Use	GSI Criteria for Surface Water Protected for Drinking Water Use
Barium	100	NA	NA	4.4E+2	NA	1.6E+5	1,900	4.4E+2	4.4E+2
Beryllium	100	NA	NA	2.4E+0	NA	1,200	160	2.4E+0	2.4E+0
Cadmium	100	NA	0.908991679	2.2E+0	NA	130	3	2.2E+0	2.2E+0
Chromium (III)	100	NA	0.86	7.4E+1	NA	9,400	120	7.4E+1	7.4E+1
Copper	100	NA	0.96	9.0E+0	NA	64,000	790	9.0E+0	9.0E+0
Lead	100	NA	0.791010652	1.0E+1	NA	190	14	1.0E+1	1.0E+1
Manganese	100	NA	NA	5.3E+2	NA	59,000	3,600	5.3E+2	5.3E+2
Nickel	100	NA	0.997	5.2E+1	NA	2.1E+5	2,600	5.2E+1	5.2E+1
Zinc	100	NA	0.986	1.2E+2	NA	22,000	4,500	1.2E+2	1.2E+2
Pentachlorophenol	NA	pH	NA	Calculated	NA	2.8	1.8	Calculated	Calculated

NA = Criterion or value is not available or not applicable.

* The formulas in this spreadsheet depend upon appropriate entries in these cells. Do not leave these cells blank. If numeric hardness or pH values are not available, enter the word "hardness" or "pH" in the appropriate cell.

Table E-1
Part 201 Industrial Criteria for Water
DSC Ltd.
Trenton and Gibraltar MI

	Part 201 Generic Cleanup Criteria and Screening Levels: Industrial				Mixing Zone Determination	
Compound	GW/SW Interface Criteria [ug/l]	Volatilization to Indoor Air [ug/l]	Groundwater Contact Criteria [ug/l]	Background Concentration [ug/l]	GSI/Mix Zone Acute Limit [ug/l]	GSI/Mix Zone Chronic Limit [ug/l]
2,4-Dimethylphenol	380	NLV	5.2E+05	NA	2,700	--
Methylphenol (all isomers)	71	NLV	8.1E+05	NA	--	--
Phenol	210	NLV	2.9E+07	NA	3,200	--
PCBs (total)	0.2 {M}	45	3.3	NA	--	--
Acenaphthene	19	4200	4200	NA	--	--
Acenaphthylene	ID	3900	3900	NA	--	--
Aniline	20.0	NLV	NLV	NA	--	--
Anthracene	ID	43000	43000	NA	--	--
Carbazole	10.0	NLV	NLV	NA	72	--
Dibenzofuran	4.0	ID	ID	NA	72	--
Fluoranthene	1.6	200	200	NA	28	--
Fluorene	12.0	2000	2000	NA	220	--
2-Methylnaphthalene	ID	ID	ID	NA	--	--
Naphthalene	13.0	31000	31000	NA	200	--
Phenanthrene	5.0	1000	1000	NA	43	--
Pyrene	ID	140	140	NA	--	--
Cyanide (Amenable)	20	NLV	57000	NA	--	--
Arsenic [b]	50 (b)	NLV	4,300	NA	--	--
Barium [a]	440 (a)	NLV	14,000,000	NA	2,500	--
Cadmium [a]	2.2 (a)	NLV	190,000	NA	--	--
Chromium (III) [a]	74 (a)	NLV	290,000	NA	--	--
Chromium (VI)	11	NLV	460,000	NA	--	--
Copper [a]	9 (a)	NLV	7,400,000	NA	--	--
Lead [a]	10 (a)	NLV	ID	NA	--	--
Magnesium	NA	NLV	1,000,000	NA	--	--
Manganese [a]	530 (a)	NLV	9,100,000	NA	--	--
Mercury	0.2	NLV	56.000	NA	--	0.0018
Nickel [a]	52 (a)	NLV	74,000,000	NA	--	--
Selenium	5	NLV	970,000	NA	--	--
Silver	0.2	NLV	1,500,000	NA	--	--
Vanadium	12	NLV	970,000	NA	220	--
Zinc [a]	118 (a)	NLV	110,000,000	NA	--	--

Criteria values are from Operational Memorandum #18, dated June 23, 2000.
ID - Inadequate data to develop criterion
NA - Not Available
NLV - Not Likely to Volatilize

[a] GSI criteria is equal to freshwater chronic value (FCV) water quality criteria, based on H = 100 mg/l in accordance with Part 201 table Footnote G and current M

[b] GSI criteria is equal to the surface water drinking water value (SWDWV) in accordance with Part 201 criteria table Footnote X.

Calculation of Generic Facility-Specific Part 201 Soil GSI Protection Criteria (GSI PC)

Directions for calculating a generic facility-specific soil GSI PC:

1. Enter the "GSI" criterion calculated on the previous page, rounded to 2 significant figures. Click the green check mark to the left of the Excel formula bar or press the "Enter" key.
2. The GSI PC will calculate and appear in Column S. The GSI PC are the higher of the Soil-Water Partition Value for GSI (Column Q) and the 20 X GSI value (Column R).

Calculate Soil GSI PC in ug/Kg (ppb)							
Hazardous Substance	* ENTER GSI	Soil-Water Distribution Coefficients (Kd) L/Kg	Henry's Law Constant (HLC) atm-m3/mol	Soil Organic Carbon-Water Partition Coefficient (Koc) L/Kg	Soil-Water Partition Value for GSI ug/Kg	20 X GSI ug/Kg	Soil GSI PC ug/Kg
Barium	4.4E+2	41	NA	NA	2.9E+5	8.8E+3	2.9E+5
Beryllium	2.4E+0	790	NA	NA	3.0E+4	4.8E+1	3.0E+4
Cadmium	2.2E+0	75	NA	NA	2.7E+3	4.5E+1	2.7E+3
Chromium (III)	7.4E+1	1.8E+6	NA	NA	2.1E+9	1.5E+3	2.1E+9
Copper	9.0E+0	360	NA	NA	5.2E+4	1.8E+2	5.2E+4
Lead	1.0E+1	11,000	NA	NA	1.8E+6	2.1E+2	1.8E+6
Manganese	5.3E+2	NA	NA	NA	NA	1.1E+4	1.1E+4
Nickel	5.2E+1	65	NA	NA	5.4E+4	1.0E+3	5.4E+4
Zinc	1.2E+2	62	NA	NA	1.2E+5	2.4E+3	1.2E+5
Pentachlorophenol	GSI	NA	2.44E-8	592	Calculated	Calculated	Calculated

NA = Criterion or value is not available or not applicable.

* The formulas in this spreadsheet depend upon appropriate entries in these cells. Do not leave these cells blank. If numeric GSI values are not available, enter "GSI" in the appropriate cell.

Table E-2
Part 201 Industrial Criteria for Soil
DSC Ltd.
Trenton and Gibraltar MI

Part 201 Generic Cleanup Criteria and Screening Levels: Industrial

Compound	GW/SW Interface Protection [mg/kg]	GW Contact Protection [mg/kg]	Particulate Soil Inhalation [mg/kg]	Direct Contact [mg/kg]	Volatilization to Ambient Air [mg/kg]	Statewide Default Background Levels [mg/kg]
2,4-Dimethylphenol	7.60	10,000	2,100,000	56,000	NLV	NA
Methylphenol (all isomers)	I	16,000	2,900,000	56,000	NLV	NA
Phenol	4.20	12,000	18,000,000	12,000	NLV	NA
PCBs (total)	NLL	NLL	5,200	20	240	NA
Acenaphthene	4.40	970	6,200,000	200,000	97,000	NA
Anthracene	ID	41	29,000,000	1,000,000	1,600,000	NA
Benzo(a)Anthracene	NLL	NLL	ID	100	NLV	NA
Benzo(a)Pyrene	NLL	NLL	1,900	10	NLV	NA
Benzo(b)Fluoranthene	NLL	NLL	ID	100	NLV	NA
Benzo(ghi)Perylene	NLL	NLL	350,000	9,100	NLV	NA
Benzo(k)Fluoranthene	NLL	NLL	ID	1,000	NLV	NA
Bis(2-ethylhexyl)phthalat	NLL	NLL	890,000	10,000	NLV	NA
Chrysene	NLL	NLL	ID	10,000	ID	NA
Dibenzo(a,h)Anthracene	NLL	NLL	ID	10	NLV	NA
Fluoranthene	5.5	730	4,100,000	180,000	890,000	NA
Fluorene	5.3	890	4,100,000	130,000	150,000	NA
Indeno(1,2,3cd)Pyrene	NLL	NLL	ID	100	NLV	NA
2-Methylnaphthalene	ID	5,500	ID	40,000	ID	NA
Naphthalene	0.87	2,100	88,000	80,000	350	NA
Phenanthrene	2.30	1,100	2,900	8,000	11.0	NA
Pyrene	ID	480	2,900,000	110,000	780,000	NA
Cyanide (Total)	400	2.50E+05	2.50E+05	12000	NLV	390 (Total)
Aluminum	NA	1,000,000	ID	300,000	NLV	6,900
Arsenic [b]	16	2,000	910	61	NLV	5.80
Barium [a]	290	1,000,000	150,000	250,000	NLV	75
Cadmium [a]	2.7	230,000	2,200	4,100	NLV	1.20
Chromium (III) [a]	2,100,000	1,000,000	150,000	1,000,000	NLV	18 (total Cr)
Chromium (VI)	3.3	140,000	240	17,000	NLV	--
Copper [a]	52	1,000,000	59,000	140,000	NLV	32
Lead [a]	1,800.0	ID	44,000	900 (draft)	NLV	21
Magnesium	NA	1,000,000	2,900,000	1,000,000	NLV	NA
Manganese [a]	11	180,000	1,500	170,000	NLV	440
Mercury	0.10 [c]	47	ID	1,100	NLV	0.13
Nickel [a]	54	1,000,000	16,000	270,000	NLV	20
Selenium	0.40	78,000	59,000	18,000	NLV	0.41
Silver	0.5 [c]	200,000	2,900	17,000	NLV	1.00
Vanadium	190	1,000,000	ID	10,000	NLV	NA
Zinc [a]	120	1,000,000	ID	1,000,000	NLV	47.00

Criteria values are from Operational Memorandum #18, dated June 23, 2000.
ID - Inadequate data to develop criterion
NA - Not Available
NLL - Not Likely to Leach
NLV - Not Likely to Volatilize

[a] GSI criteria is based on the freshwater chronic value (FCV) water quality criteria, based on H = 100 mg/l in accordance with Part 201 table Footnote G.

[b] GSI criteria is based on the surface water drinking water value (SWDWV) in accordance with Part 201 criteria table Footnote X.

Appendix F – Treatability Study Information

AUGUST MACK ENVIRONMENTAL INC.
37633 SCHOOLCRAFT ROAD
LIVONIA, MICHIGAN 48150
(734) 464-1716
(734) 464-8874 FAX

June 20, 2001

Mr. Dennis Zurakowski
DSC Ltd.
1491 W. Jefferson Avenue
Trenton, MI 48183

Re: Proposal for Environmental Services
Bench Scale Treatability Testing
DSC Ltd. Facility
Gibraltar, Michigan
August Mack Proposal Number PB037.16a

Dear Mr. Zurakowski:

August Mack Environmental, Inc. (August Mack) is pleased to submit this proposal to DSC Ltd. (DSC) to perform bench-scale treatability testing at the above referenced site. The purpose of the testing program is to develop a design mix for the in-situ stabilization of sludge present within the Tandem Mill Pond (TMP) at the Gibraltar facility. This proposal summarizes our understanding of the site conditions and presents our scope of work and costs for completion of this project.

BACKGROUND

The TMP is a six acre oil separation pond constructed to receive process and cooling water from the Gibraltar facility operations. The pond operated from the 1950's to the 1990's. Historically, water containing lubricating, hydraulic, rolling and slushing oils was discharged to the TMP. Separated oil was then removed for off-site disposal. It is currently estimated that 20,000 tons of sludge are present within the TMP. DSC is currently in the process of remediating the TMP area through a program consisting of dewatering, sludge treatment and/or stabilization, and capping. It is August Mack's understanding that the sludge material, if properly stabilized, will be allowed to remain in place for the construction of a cap over the TMP. DSC has informed August Mack that they are interested in evaluating mix ratios necessary to stabilize the existing sludge using a flyash reagent that is readily available to DSC. Based on this information, DSC has asked that August Mack provide a cost proposal to evaluate the flyash as a stabilization agent for the TMP sludge in a bench-scale setting to determine an appropriate mix ratio to meet the stabilization objectives for this project.

SCOPE OF WORK

The scope of work for this project includes preparing a Health and Safety Plan (HASP), collecting a representative sample of the sludge material, performing bench-scale treatability testing using the flyash reagent, and summarizing the results of the testing, along with August Mack's recommendations in a report to DSC. These tasks are discussed in further detail in the following sections.

Health and Safety Plan

Prior to beginning any field activities, August Mack will prepare a HASP for the lagoon/sludge sampling and treatability testing program. The HASP will be used by members of the project team, all of whom will have completed 40 hours of Hazardous Waste Operations training and eight hour refresher courses as outlined in Title 29, Part 1910.120 of the Code of Federal Regulations (29 CFR 1910.120). The HASP will provide health and safety guidelines for the anticipated work activities and will address key safety issues and potential hazards associated with the project. The plan will describe the scope of work, specify the appropriate personal protective equipment (PPE), discuss emergency procedures and contacts, list project team-member responsibilities, and outline work zones and decontamination procedures to be used during the project. All site personnel will be required to read and sign the plan prior to beginning the work to acknowledge that they understand the contents of the plan and will abide by it. All personnel that enter the work areas will be equipped with the minimum level of PPE specified by the HASP and will be required to sign the acknowledgment. For purposes of this proposal, we have assumed that this project will be performed using United States Environmental Protection Agency (US EPA) modified Level D PPE.

Sludge Sampling

August Mack will mobilize to the Gibraltar site to collect representative sludge sample for the purpose of treatability testing. Sludge will be collected from various points within the TMP to form a composite 5-gallon sample. In order to generate a representative sample, it is anticipated that a minimum of four locations will be accessed for sampling. All PPE utilized during the sampling procedures will be disposed of in locations designated by DSC.

Bench-Scale Treatability Study

The sludge samples will be subjected to bench-scale treatability testing to determine the sludge's physical characteristics and to select the most appropriate and cost-effective flyash mix ratio. As discussed with DSC, the treatability tests will evaluate the flyash reagent at various mix ratios with the TMP sludge. It is anticipated that mix ratios of 25%, 33% and 50% as compared to the weight of the test sample will be evaluated. As part of the testing, sludge physical characteristics such as percent moisture, volume increase, and unconfined compressive strength will be evaluated for each mix. Since the final remedy consists of a cap over the TMP area and no future

construction is planed for the area, a compressive strength in the range of 20-30 pounds per square inch (psi) will be deemed a successful mix.

Reporting

The results of the bench-scale treatability study will be provided to DSC approximately three weeks following collection of the sludge samples in the form of a treatability study letter report. The treatability study report will summarize the results of the bench-scale testing, identify unit costs for implementation of the various mix ratios, and provide a recommended mix ratio for achieving the solidification objectives.

COST INFORMATION

The cost to perform the proposed scope of work discussed above is $3,500. This cost includes $150 for preparation of the HASP, $2,550 for sample collection and bench scale testing, and $800 for data evaluation, project management and reporting.

The bench-scale treatability testing cost assumes that five gallons of sludge sample will be sufficient for the treatability testing and that only the flyash reagent will be evaluated. It is further assumed that DSC will arrange for the procurement of the flyash to conduct the treatability testing. The above costs assume that no analytical testing for chemical constituents is required as part of the treatability testing program. These costs assume normal working conditions will be encountered that no overhead/underground utilities or obstructions will interfere with the field activities.

Any delays, obstructions or other limitations caused by the client, his agents, or site conditions will result in additional charges to the client. If unexpected conditions are encountered in the field that cause the project to expand significantly above the proposed base scope of work, August Mack will discuss these issues with DSC and issue a revised cost for the work. No additional work will be performed without the written authorization of DSC.

Upon receiving authorization to proceed, August Mack will initiate work immediately to coordinate the sample collection. The bench-scale treatability testing will require approximately two weeks to complete. The final report will be issued to DSC within one week of completion of the bench-scale treatability testing.

A final invoice will be issued with the treatability study report. Payment for the invoices is due upon receipt. Interest charges of 1.5% per month are charged on all accounts over thirty days old unless other arrangements are made prior to invoicing.

We appreciate the opportunity to provide you with this proposal and look forward to working with you on this project. If you are in agreement with the scope of work in this proposal, please sign and return a copy to us as your formal authorization to proceed. Please feel free to contact us if you have any questions or if you require additional information.

Sincerely,

John D. Spearin
Senior Geologist

Accepted By:_____
Acknowledging the Attached Terms and Conditions
Date:_____

Appendix G – Draft Restrictive Covenant

DRAFT DEED NOTIFICATION
DSC LTD.
GIBRALTAR, MICHIGAN

The following language shall be recorded on the deed for the Property, after the property description.

The Owner shall restrict activities at the Property that may result in exposures above levels established in Operational Memorandum #18 of the Michigan Department of Environmental Quality.

(A) The Owner shall not consume or otherwise use the groundwater present in the unconsolidated zone underlying the Property described above. The unconsolidated saturated zone is perched above a clay layer, at an approximate elevation of 575 feet NGVD. The Owner shall not use the Property described above in any manner that could cause exposure of humans or animals to contaminated groundwater in concentrations that present or may present a threat to health.

(B) Sediments from the former Tandem Mill Pond contain concentrations of some constituents at concentrations greater than Part 201 criteria. Sediments from the former Tandem Mill Pond have been placed within the area shown on the deed, and covered by clean soil materials. The Owner shall not use the Property described above in any manner that causes the disruption of the surface cover placed over the impacted sediments. The Owner may conduct excavation or other activities that temporarily remove the cover for the purposes of construction or utility installation, but the Owner shall restore the surface immediately upon completion of the work.

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Appendix H – Specifications

INTERIM RESPONSE ACTIVITY SPECIFICATIONS
TANDEM MILL POND
DSC LTD.
GIBRALTAR, MICHIGAN

Section 02205 -	Soil Materials
Section 02207 -	Stone
Section 02211 -	Grading
Section 02222 -	Excavation/Earthwork
Section 02223 -	Backfilling and Compaction
Section 02936 -	Seeding and Mulching

Section 02205 - Soil Materials

Part 1 - General

1.1 Section Includes

A. Work under this Section includes the provision of soil materials that shall be used as clayand top soil for the protective soil layer component of the cover.

1.2 Codes and Standards

A. ASTM D422 (1990) Standard Test Method for Particle Size Analysis of soil.

B. ASTM D698 (1991) Test Method for Laboratory Compaction Characteristics of soil using Standard Effort (12,400 ft-lb/ft)

C. ASTM D2487 (1993) Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D. ASTM D4318 (1995) Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

Part 2 - Products

2.1 Soil Materials

A. Materials that are to be used in the work shall be subject to approval by the Engineer.

B. Clay: Clay shall be off-site suitable material as designated by the Engineer. The material shall be free of rock pieces greater than three inches in any dimension, debris, waste, perishable materials, vegetation and/or root matter, or other deleterious material. Clay soils shall be classified as GW, GC, SP, or SC according to the Unified Soil Classification System (ASTM D2487).

C. The permeability of clay soils shall not be greater than 10-6 cm/sec, when tested by ASTM D5084.

D. Samples of clay and test results from sources other than clay material stockpiled on site shall be provided to the Engineer five days prior to anticipated date of use.

E. The Contractor shall provide at a minimum one set of analytical test results per borrow source, including the clay material stockpiled on site. The material furnished shall be tested for the parameters on the Target Compound List (TCL), which includes volatile organic compounds, semi-volatile organics, pesticides/PCBs, and the target analyte list metals and cyanide. Testing shall be performed by an independent laboratory in accordance with the SW-846 procedures. Testing shall be incidental to providing soil material. The Engineer may direct the Contractor to provide additional set(s) of these analyses if there is a change in the nature or character of the borrow material indicative of contamination. These additional tests shall be performed by the Contractor at no additional expense to the Owner. The Owner reserves the right to reject the material based on results of the tests.

F. Regardless of the source of the soil material, it shall remain the responsibility of the Contractor to provide the materials required for this work in adequate quantity and quality.

G. The Contractor shall retain the services of an independent geotechnical testing laboratory to perform all testing of the soil material. Results of all testing shall be submitted to the Engineer.

Costs for the laboratory services and the testing shall be incidental to the appropriate unit price for payment of the soil material.

H. Topsoil Material: For purposes of definition, the Contractor may use a suitable vegetative top cover as an alternative to topsoil. This suitable vegetative top cover shall be of a quality that will support a healthy plant growth. It shall be workable and free of refuse, roots larger than 1/8-inch in diameter, stones, brush, weeds, or other foreign material larger than two inches in any dimension which would be detrimental to the proper development of plant growth. This topsoil shall be of a grain-size distribution and plasticity such that is classified as USCS silt or clay (ML or CL), sand (SM), clayey sand, SC), low plasticity, or mixtures of these soil types. A portion of the required topsoil material may be obtained from the parcel of land immediately south of the project site.

The vegetative top cover shall contain not less than 3 nor more than 10 percent of organic matter, as determined in accordance with AASHTO T-194, with a pH range approximately 6 to 7. Topsoil shall not be placed when in a frozen or muddy state.

I. Samples of topsoil material and test results shall be provided to the Engineer five days prior to anticipated date of use.

Part 3 - Execution

3.1 Stockpiling of Soil Materials

A. Stockpile materials on site at the locations approved by the Engineer.

B. Stockpile materials in sufficient quantities to meet project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

E. Cover soil stockpiles to prevent erosion.

3.2 Stockpile Cleanup

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free-standing surface water.

3.3 Construction

A. The soil material shall be placed in lifts that are parallel to the final surface, as shown on the Drawings. Materials placed by dumping in piles or windrows shall be spread uniformly before being compacted. The loose lift thickness shall not exceed eight inches. The placement of material to be hand compacted, including material compacted by manually directed power tampers, shall not exceed four inch loose lifts.

E. Compaction shall be accomplished by use of appropriate compaction equipment to obtain the required performance. At a minimum, the clay shall be compacted to 90 percent of the maximum dry density as determined by ASTM D698. Compaction tests shall be conducted at a frequency of 5 tests per acre per lift of fill. Topsoil shall be proof rolled only.

C. The Contractor shall scarify the surface of the previous compacted lift prior to the placement of each following lift to allow proper bonding of the lifts and as directed by the Engineer. The equipment provided by the Contractor to scarify the surface shall possess sufficient weight to penetrate one to two inches into the compacted material.

Part 4 - Testing and Inspection

4.1 Clays shall be tested for:

Particle Size	ASTM D1140 and ASTM D422	Rate: 1/1000 yd^3
Liquid and Plastic Limits	ASTM D4318	Rate: 1/1000 yd^3
Compaction Curve	ASTM D698 or ASTM D1557	Rate: 1/5000 yd^3
Permeability	ASTM D5084	Rate:1/10,000 yd^3

4.2 Topsoil material shall be tested for organic content (AASHTO T194) for pH in accordance with EPA Method 9045, and grain size analysis (ASTM D422). One set of tests shall be provided for each borrow source.

END OF SECTION

Section 02207 - Stone

Part 1 - General

1.1 Section Includes

A. Work under this section includes erosion protection along storm water drainage swales.

1.2 Codes and Standards

A. AASHTO - M147 - Materials for Aggregate and Soil-Aggregate.

Part 2 - Products

2.1 Aggregate Materials

A. Stabilization stone for portions of the drainage swales shall be rip rap. The largest pieces of material shall have volumes not to exceed 2 cubic feet. Sufficient smaller rock pieces shall be present to form a dense and stable blanket when placed in a layer 2 feet thick over the drainage swales. Oversized fragments shall be removed.

Part 3 - Execution

3.1 Stockpiling

A. Stockpile materials onsite at the locations designated by the Engineer.

B. Stockpile in sufficient quantities to meet project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Direct surface water away from stockpile site so as to prevent erosion or deterioration of materials

3.2 Stockpile Cleanup

A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free-standing surface water.

END OF SECTION

Section 02211 - Grading

Part 1 - General

1.1 Section Includes

A. Work in this section shall include the grading required to bring grades to proper elevations using on site material. Grading as required shall be smooth and free from irregular surface changes.

1.2 Related Sections

A. Section 02205 – Soil Materials
B. Section 02222 – Excavation/Earthwork

1.3 Codes and Standards

A. ASTM D698 (1991) Test Method for Laboratory Compaction Characteristics of Soil using Standard Effort (12,400 ft/lbf/ft)

Part 2 - Products

2.1 Materials

A. Existing soil material.
B. Soil and sediment excavated from the Tandem Mill Pond.
C. Imported soil material.

Part 3 - Execution

3.1 Examination

A. Verify the existing site conditions based on meetings and site visits.

B. Lines and grades for the work shall be as shown on the Drawings. The lines and grades shown are intended to be the final surfaces after compaction and any settlement during construction.

C. The Contractor shall establish benchmarks and/or horizontal control monuments. Survey control during the work shall be the responsibility of the Contractor.

D. The Contractor shall provide adequate water trucks or other equipment for dust control at the construction site.

3.2 Preparation

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect existing utilities from damage during construction procedures.

D. Notify and obtain all identified permits required from local companies if any utility is to be removed and/or relocated.

E. Protect above- and below-grade utilities that remain.

F. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs, if any, from excavating equipment and vehicular traffic.

3.3 Subsoil Grading

A. After excavation (Section 02222) of material from Area 1 and Area 2 is completed, grade existing soil material to the contours and elevations shown.

3.4 Filling

A. Fill areas to contours and elevations shown on the drawings with the specified materials. Place fill materials on continuous layers and compact in accordance with the compaction requirements in Section 02223.

3.5 Tolerances

A. Top surface of subgrade shall be ±0.1 foot.

B. Compaction shall be to 90 percent of the maximum dry density per ASTM D698.

C. Moisture content shall be at or slightly above the optimum moisture content defined by ASTM D698.

END OF SECTION

Section 02222 - Excavation/Earthwork

Part 1 - General

1.1 Section Includes

A. Work under this section includes the excavation and removal of soil and sediment from the Tandem Mill Pond areas shown on the Drawings.

B. The Contractor shall locate existing aboveground and underground utilities and pipelines in the areas of the work. If utilities are to remain in place, the Contractor shall provide adequate means of protecting such during excavation and fill placement operations. Should uncharted or incorrectly charted utilities and/or piping be encountered during excavation, the Contractor shall consult the Engineer immediately for directions.

C. The use of explosives shall not be permitted.

D. Prior to the commencement of work, the Contractor shall have examined the existing Drawings and Specifications, shall have visited the site, consulted the records of previous construction at the site, records of adjacent construction and of existing utilities and pipelines and their connections, and noted conditions and limitations that may affect the work.

1.2 Related Sections

A. Section 02211 - Grading

B. Section 02223 - Backfilling and Compaction

Part 2 - Products

A. Soil backfill shall be suitable soil material as described in Section 02205.

Part 3 - Execution

3.2 Preparation

A. Identify required lines, levels, contours, and datum.

3.3 Excavation

A. Excavate visibly impacted soil and sediment in Tandem Mill Pond Areas 1 and 2, and around the perimeter of the Tandem Mill Pond. Excavate additional material as directed by the Engineer or Owner.

3.4 Overexcavation

A. Care shall be exercised so that excavations are not carried significantly beyond the lateral limits shown on the Drawings, unless visibly impacted soil is determined to extend beyond the lateral limits. If excavations are extended too deep by the Contractor, such excavations shall be backfilled with suitable fill as specified in Section 02205 and compacted as described in these Specifications at no additional cost to the Owner, subject to review and approval by the Engineer.

3.5 Treatment and Placement

A. Excavated material shall be mixed with fly ash or other materials provided by the Owner. The excavated material and fly ash shall be mixed in the proportions and manner specified by the Engineer.

B. The Contractor shall use water sprays or other management practices to reduce the generation of dust and other emissions during mixing of excavated soil and fly ash.

3.6 Stability of Excavations

A. The Contractor shall follow OSHA and other applicable regulations relative to excavation stability and methods of providing a stable excavation. The Contractor shall shore and brace the sides of excavations to comply with local codes and ordinances. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. The Contractor shall take the necessary precautions to guard against settlement or collapse of adjoining structures and/or nearby piping and utilities.

3.7 Protection

A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

END OF SECTION

Section 02223 - Backfilling and Compaction

Part 1 - General

1.1 Section Includes

A. Work in this section includes the procedures for backfilling to subgrade and/or final grade elevations, and compaction requirements. This includes the backfilling and compaction of treated soil and sediment.

B. The procedures for the placement and method of backfilling shall be approved by the Engineer prior to start of the fill placement.

C. The Contractor must furnish all labor, equipment, appliances and material in performing operations in connection with backfilling and compaction.

1.2 Delayed Reactions

A. Section 02205 – Soil Materials

B. Section 02211 – Grading

C. Section 02222 – Excavation/Earthwork

1.3 Costs and Standards

A. ASTM D698 (1991) Test method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft/lbf/ft).

B. ASTM D2922 (1991) Standard Test Method for Density of Soil and Soil-Aggregate in place by Nuclear Methods (shallow depth).

Part 2 - Products

2.1 Fill Materials

A. No brush, roots, sod, or other deleterious or unsuitable materials not meeting the requirements of Section 02205 shall be placed in fill areas. The suitability of fill materials is subject to the approval of the Engineer. Fill shall not be placed upon saturated surfaces or loose windblown materials. Fill placement shall be temporarily stopped due to unsuitable weather conditions as requested by the Engineer.

B. Fill will not be placed that has a moisture content that produces saturation upon compaction.

Part 3 - Execution

3.1 Compaction of Treated Material

A. After the excavated material in the sediment cell has been mixed with fly ash, the material in the sediment cell shall be compacted. The required density is specified as 80 percent of the maximum dry density as measured by ASTM D698 (Standard Proctor Test).

B. The Engineer will inspect the compacted materials to ensure uniformity. If soft spots are located by such inspection, the Contractor shall recompact or remove and replace the soft material as directed by the Engineer.

3.2 Backfilling

A. Clay shall be spread in horizontal 8-inch (maximum) loose lifts and compacted. Backfill shall be cut material or soil material (Section 02211 and Section 02205).

3.3 Compaction

A. After each layer of soil material has been placed and spread, the layer shall be compacted as required by the individual specifications (Technical Specification 02205). The required density is specified as 90 percent of the maximum dry density as measured by ASTM D698 (Standard Proctor Test).

B. The Engineer will inspect the compacted materials to ensure uniformity. If soft spots are located by such inspection, the Contractor shall recompact or remove and replace the soft material as directed by the Engineer.

Part 4 - Sampling and Testing

A. Before initiating any backfilling, the Contractor shall submit representative samples of each source of off-site fill material to the independent testing laboratory for determination of the maximum dry density and corresponding optimum moisture content in accordance with ASTM D698 (Standard Proctor).

B. The use of off-site fill material must be approved by the Engineer. Soil stockpiled on Landfill 1B at the DSC Gibraltar facility is approved for use as clay material. The Contractor shall notify Engineer of the proposed types and quantities of off-site fill materials to be obtained.

C. Additional Standard Proctor tests shall be performed as directed by the Engineer based on review of the grain size and Atterberg limit testing data collected as defined by Specification 02205.

D. Chemical testing of offsite materials shall also be performed as required by Specification 02205.

E. In situ field density of compacted materials shall be determined using a nuclear density gage in accordance with ASTM D2922 or other methods listed in Technical Specification 02205. Five in situ density measurement shall be taken per acre per lift.

END OF SECTION

Section 02936 - Seeding and Mulching

Part 1 - General

1.1 Section Includes

A. The scope covered in these Specifications covers the seeding and mulching of construction or otherwise disturbed areas. This includes the entire area of the Tandem Mill Pond, including the sediment cell, unless directed otherwise by the Engineer. The specified seed varieties and quantities shall be uniformly distributed over disturbed ground areas. Seeding will be performed in such manner that will produce an even stand of grass over the entire area seeded. The Contractor shall furnish all labor, materials, equipment, and incidentals required to accomplish the activity.

1.2 Related Sections

A. Section 02205 – Soil Materials

B. Section 02211 - Grading

1.3 Codes and Standards

A. Federal Specified (Fed. Spec.) O-F-241D - Fertilizer, Mixed, Commercial.

B. U.S. Department of Agriculture - Federal Seed Act of 9 August 1939 (53 Stat. 1275).

Part 2 - Products

2.1 Seed

A. Seed shall be state-certified seed of the latest season's crop and shall be delivered in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed-seed content, and inert material. Labels shall conform to USDA Federal Seed Act, Rules and Regulations and applicable state seed laws. Wet, moldy, or otherwise damaged seed shall be rejected.

2.2 Fertilizer

A. Fertilizer shall be controlled-release, commercial grade, granular free flowing, uniform in composition, delivered in fully labeled sealed containers, and shall conform to applicable state and federal regulations. Fertilizer shall bear the manufacture's guaranteed statement of analysis. Fertilizer rate requirements shall be in accordance with the paragraph: Fertilizer Rate.

2.3 Top Soil

A. Top soil shall meet the requirements of suitable top soil material in Section 02205 - Soil Materials.

B. Top Soil Placing: Where such material is necessary to permit establishment of vegetative cover or required by the specifications, top soil shall be uniformly distributed and evenly spread to a minimum thickness of 3 inches prior to seeding in those areas of the site disturbed by grading. The spreading shall be performed in such a manner that planting can proceed with little additional soil preparation or tillage. The surface resulting from top soil placement shall meet the finished surface requirements as specified in Section 02211 - Grading.

Part 3 - Execution

3.1 Delivery and Storage

A. Delivery: Seed shall be inspected upon arrival at the job site, and unacceptable material shall be removed from the job site.

1. During delivery, seed shall be protected from any drying or contamination by detrimental material.

2. Fertilizer shall be delivered to the site in the original, unopened containers bearing the manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state and federal law.

B. Storage:

1. Seed fertilizer shall be stored in cool, dry locations away from contaminants.

2. Material shall be stored in areas designated or as approved by the Engineer.

3.2 Preparation of Seedbed

A. General: The Contractor shall place top soil and established finished grades in accordance with this section and the Section 02211 - Grading. Any eroded finished grades shall be repaired in accordance with these Specifications.

B. Tillage: Subsequent to grading, the areas to be seeded shall be thoroughly scarified by approved means to a depth of at least 2 inches by plowing, discing, harrowing, or rototilling. The work shall be performed only during periods when beneficial results are likely to be obtained. When conditions are such, by reason of drought, excessive moisture, or other factors, that satisfactory results are not likely to be obtained, the work will be stopped by the Engineer and shall be resumed only when directed. The soil shall be leveled to meet finished grade requirements before seeding. Seedbed preparation shall be performed on the contour to reduce soil loss.

3.3 Application of Fertilizer

A. Fertilizer shall be incorporated into the soil to a depth of 2 inches during seedbed preparation. When hydroseeding, the fertilizer may be applied with the use of hydroseed and mulch.

3.4 Fertilizer Rate

A. Fertilizer shall be applied at the rate of 500 lbs. per acre.

B. The combination of fertilizer to be placed at the specified rate includes:

- Nitrogen (N) - 16 lbs/acre
- Phosphorus (P_2O_5) - 20 lbs/acre

3.5 Application of Seeding

A. The seeding shall be applied uniformly at a rate of 40 lbs/acre (pure live seed) of Blando Brome.

B. An alternative seeding mixture may be permitted, subject to approval by the Engineer.

3.6 Planting Seed

A. Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rains, traffic, or other cause, shall be reworked to restore the ground to the specified condition. Seed shall be planted at the rate specified herein.

3.7 Methods

A. Seed planting shall be accomplished by:

1. Hydroseeding: The Contractor shall accomplish seeding, fertilizing, and mulching by hydroseed application. Seed and fertilizer in the amount per acre designated, wood cellulose fiber mulch at the rates recommended by the manufacturer for the specific fiber mulch used, shall be combined with water to provide a slurry, and hydraulic application shall be performed in such manner that the liquid carrier will uniformly distribute the material over the entire area to be seeded at rates not less than indicated herein. No following compaction will be done.

2. Alternative means of application of seed, fertilizers, and mulch may be approved by the Engineer, especially where hand or mechanical seeding and mulching is preferable to hydroseeding.

3.8 Vegetative Mulching

A. The Contractor shall perform vegetative mulching on the same day as planting seed. Vegetative mulching is not required on hydroseeding.

B. Applying Mulch: Straw mulch shall be spread uniformly in a continuous blanket over the seeded areas, using 2 tons of material per acre. The mulch shall be spread in such manner as to prevent bunching.

C. If high wind conditions exist, it may be necessary to secure the mulch. The following mulch-anchoring systems can be used:

- punched straw using roller studs which do not cut the straw (4 tons/acre is required with this method)
- net-anchored straw
- tackifiers with straw

3.9 Protection and Cleanup

A. After seeding and mulching operations have been completed, barricades and approved warning signs shall be erected by the Contractor as required to provide protection against traffic and trespass. Excess material from seeding and mulching operations, and debris, shall be cleaned up and disposed of off the site.

3.10 Establishment and Maintenance Period

A. Field Seeding: The Contractor is responsible for the establishment and maintenance of field seeding as specified herein during the period of this Contract until all of the work on the project has been completed and accepted by the Engineer. At a minimum, the contractor is responsible for maintaining the seeded areas until a viable vegetative cover is established.

B. Watering of field seeding is not required.

C. Reseeding and Repair: During the period of this Contract, any eroded or damaged seeding shall be repaired and reseeded by the Contractor at no extra charge.

3.11 Final Acceptance

A. Final inspection and acceptance will be performed by the Engineer prior to the termination of the Contract. Acceptance will be based upon material, performance, and completion of those items of work specified for seeding.

END OF SECTION

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